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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Dyestuff Reconstruction

THE financial reconstruction scheme in connection with the British Dyestuffs Corporation, which has been the subject of rumour for some time past, is now about to be put into effect. The exact financial details are not at the moment available, but probably by the time this journal reaches its readers they will have been made public in the daily press. The scheme is to be submitted to a meeting of shareholders on November 25. Meanwhile, certain general information has been disclosed, and we believe that what appears below accurately represents the situation.

The first important point is that an agreement has been reached between the Corporation and the Government, the effect of which will be to liberate the Corporation from State control and place it in the position of every other dyestuffs company in this country. The Government at present hold £1,700,000 worth of shares, carrying with them the right to nominate two directors and to exercise a veto over arrangements or agreements with foreign interests. The Corporation has arranged to buy the Government shares for the sum of £600,000, and with this direct transfer the interest of the Government in the Corporation will

cease. At present the Government nominees on the board of directors are Sir Alfred Mond and Sir Henry Birchenough, who retire under the new arrangement, but it may be taken for granted that a place will be found on the board for so valuable a member as Sir Alfred Mond. The arrangement obviously puts the Corporation in a much freer and more favourable position, and as the Corporation represents so largely the British dyestuffs industry itself, it may very well prove equally favourable to the industry and to what is even bigger—British organic chemical science and industry as a whole.

The question of foreign agreements naturally arises. Clearly the Corporation will now be free to enter into agreements with German, American, Swiss, Italian, or other interests. In this respect, however, it will enjoy no advantage over any other concern; it will merely be in precisely the same position. Nor, so far as we can ascertain, is any step actually taken or in contemplation towards any such agreement. But if occasion should arise, the Corporation will be able to act as it thinks best. What would become, then, of the smaller dyestuff concerns in the event of some such agreement as that formerly proposed with the I.G.? They would be exactly in the position of smaller firms in any other industry—soap, artificial silk, engineering, shipping, and so on. They might specialise in a limited field and still hold their own, or they might come to an arrangement with the larger combine. Their difficulty is simply the difficulty that must always arise under mass organisation, as in Germany or America.

The financial part of the reconstruction, as we have said, will be announced in detail later, but it is understood that if the shareholders adopt the scheme to be submitted by the directors the accounts will be made up to March 31, and that working under the new arrangement will date from April 1. Although the net loss up to October 31, 1923, was £449,276, there is reason to believe that for the 17 months ended March 31 the company made a definite, if small, profit, and that during the last six months further progress has been made. There are considerable cash resources at the disposal of the company, and those in a good position to judge, while recognising that competition is increasing, are not disposed to take too gloomy a view of the prospects.

In connection with the new German trust, it is announced that the formalities have been completed. The total capital of the trust is stated to be over 32 million sterling. As was pointed out in a recent note on the subject, the present fusion aims at nothing less than the organic unity of the German dyestuffs industry and goes far beyond the federal relations that existed under the Interessen Gemeinschaft. It is a reasonable inference that as a competitive factor Germany will

become more rather than less formidable, and the need, therefore, of removing every cause of weakness from the British industry is the greater.

The Economics of Smokeless Fuel

THE evidence that has recently been submitted to them by well-known fuel technologists should have an important influence on the members of the Coal Commission in so far as their ultimate recommendations in connection with the process of low-temperature carbonisation are concerned. We referred briefly last week to the unusually clear and pertinent views that Dr. Lessing expressed in connection with the problem, and if his evidence is taken in conjunction with that given later by Mr. D. Milne Watson, little doubt will be left in the mind as to the true reason why smokeless fuel has time and again failed to realise the hopes held out for it ever since Parker entered the field with his process some twenty years ago. The work that has been done must not, however, be regarded as unproductive, for it may now be said that complete technical success with a process, which looks so simple but which has proved unusually stubborn in practice, is in sight.

Unfortunately, the economic problem introduces complexities, which no amount of technical progress can ever remove, and which will probably continue to stand in the way of any attempt at the mass production of semi-coke. In illustration of this, two points that emerged from the evidence may be quoted. The first is that in order that a smokeless fuel undertaking might operate on a profitable basis it would be necessary for semi-coke to realise a price of some 55s. per ton, as compared with the present average price of household coal of 45s. Secondly, it was contended that the well-known MacLaurin plant—which we have frequently referred to as being probably the most perfect yet devised from the technical point of view—is working at a loss of from 7s. to 8s. per ton. The reason, therefore, for the non-commercial success of low-temperature coke is self-evident.

There are one or two ancillary points in Dr. Lessing's evidence that are well worth fuller discussion, in particular his reference to the disparity in the practice of coke-oven undertakings and gasworks, so far as the extraction of benzol is concerned. At coke ovens it is, of course, the custom to strip the benzol vapours from the gas, refine the resulting liquid, and market it as a motor spirit. The same practice was in common use among gas undertakings during the war, mainly as an emergency measure, but the introduction of the therm system of selling gas changed the whole complexion of the economics of benzol stripping. For instance, two gallons of benzol per ton of coal are normally yielded by stripping, the average calorific power of the crude liquid obtained being 130,000 B.Th.U. per gallon. At the same time these two gallons represent about 100 cubic feet of gas, so that the revenue derived from benzol marketed in its various forms may be approximately contrasted as follows:—

2 gallons of crude spirit at 9d. net	- - =	18d.
100 cubic ft. of benzol at 4s. per 1,000 cub. ft.	=	4'8d.
260,000 B.Th.U. at 10d. per therm	- - =	26d.

While, therefore, it was commercially advantageous to extract benzol from the gas while the volume basis

of selling was in force, it will be readily seen that, as heat units are now sold, the benzene has a much greater value if left in the gaseous form. Dr. Lessing seemed to be a trifle in doubt as to which policy was the more desirable from the point of view of the nation's interest, but we have little doubt that he must have considered the question on such lines as we have suggested above. Another point to which reference was made was the misleading statement that low-temperature carbonisation yields oils. It certainly is high time to realise that the non-aqueous condensate obtained from the process is essentially (as with high-temperature methods) a tar and not a straight oil; and although it is a primary tar of a comparatively thin nature, it still demands treatment for the removal of pitch in order to make it readily miscible with petroleum products.

Research in Oil and Colour

THE presidential address of Dr. H. Houlston Morgan at the annual meeting of the Oil and Colour Chemists Association (the text of which is now published in the journal of the Association) states with admirable clearness and practical sense the need for increased research in the oil and colour industry. The mistaken attitude to which he addresses himself at the outset is that, while many industrial concerns apply the results of research to the commercial side of their business—office methods, sales organisation, advertising, and so forth—they still cling to the idea that their raw materials and so-called secret processes, factory methods of a hundred years ago, need little or no improvement. The explanation probably is that excessive concentration on the purely commercial side has led to a corresponding neglect of more fundamental aspects. In the end, the result is loss. Dr. Morgan's own estimate is that, in the aggregate, far more money has been *wasted* on commercial research than has ever been *expended* on technical research. There is the further and now widely recognised mistake that while a certain amount of investigation on the manufacturing and technical side pays, the firms undertaking it should keep the work and its results as much to themselves as possible. The weakness of this position, as Dr. Morgan frankly points out, is that, as a result of this secretive method of working, not only is nothing permitted to leak out but new knowledge is prevented from coming in.

The alternative policy, briefly outlined in the address, begins with the idea of collective fundamental research, undertaken in the interest and at the cost of the whole industry, into the properties of raw materials and the changes liable to occur in them during manufacture, storage, and usage. This work, Dr. Morgan suggests, could best be done in universities, technical colleges, the laboratories of the Department of Scientific and Industrial Research, or in a separate laboratory organised and directed by a properly constituted research association. Instead of curtailing, this would be more likely to expand the research work of individual firms, by giving the staffs the basic knowledge they require to begin with, and enabling them from this common basis to pursue the more specialised studies affecting their own firms. This is really nothing more

than the policy of laying one's foundations before one starts to build, and to divide the building into floors and apartments. When it comes to detail, it is surprising to learn from so good an authority, how many problems there are in this one industry still requiring both fundamental and more advanced investigation. The final conclusion is that neither traditional repute, nor skill in business organisation, nor ingenuity in broadcasting advertising slogans can, in the long run, compensate for inferiority in goods or deficiency in production. Scientific research on the manufacturing side thus becomes as essential for commercial success as are insurance, advertising, and sales organisation.

Another Smokeless Fuel Conference

THE Chemical Engineering Conference held in Leeds in July, during the annual meeting of the Society of Chemical Industry, is to be followed on Friday, the 20th inst., by a joint conference in Sheffield on the subject of "Solid Smokeless Fuel." The bodies responsible for organising the conference are the Society of Chemical Industry (Chemical Engineering Group and Yorkshire Section), the Institution of Chemical Engineers, the Institution of Gas Engineers, and the Midland Institution of Mining Engineers. The arrangements appear to have been excellently planned, not only with a view to the convenience of those attending, but with the object of really advancing knowledge and opinion on the smokeless fuel problem.

At the Leeds conference, three particularly able papers were presented on "Smokeless Fuel" by Dr. Lander and Dr. Margaret Fishenden; "Solid Smokeless Fuels," by Mr. Edgar C. Evans; and "A Study of the Tars and Oils Obtained from Coal," by Mr. F. S. Sinnatt and Mr. J. G. King. These raised so many points of practical and scientific interest that the time available for discussion proved quite inadequate, and very wisely the organisers have decided to resume the consideration of these papers at Sheffield. In addition, three winning papers in a recent coke competition are to be presented—"Coke Production," by the Research Station of the Woodall-Duckham Companies; "Coke Preparation," by Mr. Falconer M. Birks; and "Coke Utilisation," by Mr. F. H. Arms. Apart from the papers themselves, a representative group of experts have already promised to take part in the discussion, so as to lead it along profitable lines. These include Dr. Lander, who will give a résumé of the first two papers read at Leeds; Dr. E. W. Smith, who will speak on the qualities requisite in a solid smokeless fuel for domestic use; Professor R. V. Wheeler on the production of free-burning solid smokeless fuel at high temperatures; Mr. E. V. Evans on the combustibility and reactivity of coke; Mr. Douglas Rider on coke quenching; and Mr. F. M. Birks on coke handling, screening, and breaking. All these should be contributions of real value.

It may be recalled that the Sinnatt-King paper at Leeds dealt with the more advanced subject of the tars and oils obtained from coals, research into which is still in its early stage. This subject, therefore, so large and important in itself, is to be excluded for the moment from the Sheffield discussions, and to be

reserved for further consideration at another conference provisionally fixed for Friday, February 19, 1926, in Manchester. The whole subject is being handled with excellent judgment, and the conferences promise to be of great use and interest to all concerned.

Books Received

- FUNDAMENTALS OF PHYSICAL CHEMISTRY. By Dr. Arnold Eucken. London and New York: McGraw-Hill Book Co., Inc. Pp. 680. 27s. 6d.
- REPORT OF THE FUEL RESEARCH BOARD FOR THE PERIOD ENDED DECEMBER 31, 1924, WITH REPORT OF THE DIRECTOR OF FUEL RESEARCH. London: H.M. Stationery Office. Pp. 78. 1s. 6d.
- ELEMENTARY QUALITATIVE AND VOLUMETRIC ANALYSIS. By F. H. Campbell. London: Macmillan and Co., Ltd. Pp. 98. 6s. 6d.
- VOLATILE SOLVENTS AND THINNERS USED IN THE PAINT AND VARNISH INDUSTRIES. By Noël Heaton. London: Ernest Benn, Ltd. Pp. 158. 15s.
- THE CHEMISTRY OF DRYING OILS. By Dr. R. S. Morrell and H. R. Wood. London: Ernest Benn, Ltd. Pp. 224. 21s.
- THREE CENTURIES OF CHEMISTRY. By Irvine Masson. London: Ernest Benn, Ltd. Pp. 191. 10s. 6d.
- PERFUMES, COSMETICS AND SOAPS, WITH SPECIAL REFERENCE TO SYNTHETICS. VOL. I. A DICTIONARY OF RAW MATERIALS. By W. A. Poucher. London: Chapman and Hall, Ltd. Pp. 304. 16s.
- INTRODUCTORY COLLEGE CHEMISTRY. By Harry N. Holmes. London and New York: Macmillan and Co. Pp. 488. 14s.

The Calendar

1925 Nov. 16	British Science Guild. First Annual Norman Lockyer Lecture: "The Link Between Mind and Matter." Sir Oliver Lodge. 4 p.m.	Hall of the Goldsmiths' Company, London.
16	Birmingham University Chemical Society: "The Greatest Chemist of the Past Century."	University, Birmingham.
16	Faraday Society: Ordinary Meeting. 8 p.m.	Burlington House, Piccadilly, London.
17	Hull Chemical and Engineering Society: "Some Aspects of the Corrosion and Oxidation of Metals." Ulick R. Evans. 7.45 p.m.	Grey Street, Park Street, Hull.
18	Society of Glass Technology. 2.30 p.m.	University, Leeds.
18	Institute of Chemistry (London Section): Annual Meeting.	London.
18	Leicester Literary and Philosophical Society (Chemistry Section): Address by the President of the Section—Dr. F. J. Young. 8 p.m.	Museum, New Walk, Leicester.
19	Worshipful Company of Dyers: "The Patent Law as it Affects the Dyemaking and Dye-using Industries." Ernest F. Ehrhardt. 6 p.m.	Dyers' Hall, Dowgate Hill, London.
19	Chemical Society: Ordinary Scientific Meeting. 8 p.m.	Burlington House, Piccadilly, London.
20	Society of Chemical Industry (Chemical Engineering Group and Yorkshire Section), Institution of Chemical Engineers, Institution of Gas Engineers, Midland Institute of Mining Engineers: Conference on Solid Smokeless Fuel. Chairman—Sir Arthur Duckham. 10 a.m.—5.30 p.m.	University, St. George's Square, Sheffield.
20	Society of Dyers and Colourists (Manchester Section): "The Behaviour of Different Starches towards Dye-stuffs and Iodine." J. Huebner and K. Venkataraman.	36, George Street, Manchester.
20	Institute of Chemistry (South Wales Section): Annual General Meeting.	Thomas' Cafe, Swansea.
20	Junior Institution of Engineers: "De-Hydration of Tar." G. E. Wills. 7 p.m.	39, Victoria Street, London.

The Chemistry of Adhesive Substances.—(I)

By G. Malcolm Dyson, B.Sc., Ph.D., A.I.C.

In the following article Dr. Dyson deals with the chemistry of animal adhesives. In the first part he describes the properties of glues and gelatins, and enumerates the methods of their chemical examination. The conclusion will appear in our next issue.

THE term "adhesives" is somewhat loosely applied to all the heterogeneous colloidal substances which find an application in joining together an equally wide and varied assortment of materials. They number among their ranks such substances as casein, gelatin, glue, albumen, pectin, gums, mucilages, resins, moss extracts, collodion solutions, cellulose acetate dopes, waste sulphite liquor, silicate of soda, rubber, etc., etc., and strictly speaking the term should include the various cements and solders used in the arts for constructional and mechanical purposes, but from a chemical standpoint it is convenient to restrict the term to those colloidal substances of an organic nature which are contained in the following sections:—

- | | |
|--------------------------------------|------------------------|
| I. Glues and Gelatins | } Animal Adhesives. |
| II. Casein Adhesives | |
| III. Vegetable Gums. | } Vegetable Adhesives. |
| IV. Rubber and Gutta-percha Cements. | |

Of these groups, the first three will be dealt with in this article, the fourth being rather a special department of rubber chemistry than a logical development of the adhesive industry.

The glues and gelatins may be divided into four main classes, although, of course, there are an almost infinite number of variations recognised commercially, which depend on properties such as odour, size and shape of cakes, etc. The main divisions, however, are:—

- (1) *Hide Glue*, utilising skins, hide trimmings, earlaps, and tanned and untanned leather scrap.
- (2) *Bone Glue*, utilising degreased bones, dried bone junk, garbage, and "clean bone" from the button factories.
- (3) *Animal Glue*, from the abattoir offal, sinews, tendons and hoofs.
- (4) *Fish Glue*, from fish offal.

Hide Glue

The hides which are untanned can be treated straight away for glue, but leather scrap from tanned leather undergoes a species of detanning, in which it is soaked in a special solution to remove the tanning materials, and to "plump" the skin. Chrome tanned leather does not give a good glue, while of the fresh skins, those of the horse are preferred to those of cattle, although the skins from the Argentine beef trade yield a very good glue.

The raw material for any form of glue manufacture owes its value to the fact that the intercellular spaces are filled with a protein substance known as "collagen," which on treatment with steam breaks down with the formation of a less complex protein substance, which in the pure state constitutes gelatin, and when more or less coloured and impure is known as glue.

The skins are treated with a dilute solution of an alkali carbonate, followed by immersion for a few hours in dilute acid, after which "liming" takes place. This consists in treating the skins with milk of lime which acts as a depilatory and "plumps" the skin out. The large skins can be treated in shallow cement tanks, but the scrap is usually agitated with the lime suspension in rotating drums. A well limed skin should be smooth and homogeneous in its appearance and of a bluish colour. A large number of patented processes have been devised for application to the skins between liming and the boiling for glue, with a view to the improvement of the final product, but most of them are only variations of the deodorising and bleaching processes. The most usual and simplest process consists in treating the skins with sulphur dioxide dissolved in dilute hydrochloric acid, which cleanses and bleaches the skins.

The boiling for glue is done in enamelled or lead-lined digestors capable of withstanding a moderate pressure, and fitted with closed and open steam coils. The bulk of the heating is done with the open steam coils, the condensation providing the necessary water for the extraction, while the actual extraction is conducted on the enrichment principle.

After placing the shredded material in the "kettle," a preliminary blow-through is given with the cocks open, in order to remove odorous matters, many of which are volatile in steam. Steam is then turned into the first row of digestors and a pressure of 1.2 to 1.5 atmospheres maintained for about half an hour. The "broth" from each digester is then blown over into the digestors in the next row, which are filled with fresh material, and the process of steaming repeated down the whole battery until the broth contains about 15 to 20 per cent. of solid matter. By regulating the course of the various extracts through the battery it is possible to segregate the enriched first, second and third liquors, which give rise to different grades of glue and size.

The "broth" is now bleached. In practice the use of sulphites, either as sulphur dioxide or as hydrosulphite or rongalite is the universal practice. The use of hydrogen peroxide has been proposed, but it impairs the quality of the finished product. At this stage the broth is cloudy, owing to the presence of suspended matter, and must be clarified. On the whole, clarification with alumina, calcium phosphate or albumen followed by decantation of the clear liquor, is preferable to any form of filtration, since the latter must of necessity be a long operation at a fairly high temperature, and exposure to a elevated temperature for any considerable period weakens the strength of the glue, and contaminates it with the somewhat odorous decomposition products. However, for the clearing of inferior glues and sizes filtration through wood wool is used, the temperature being maintained at 70° C. and a slight pressure kept on the surface of the liquid.

The glue solution is now evaporated, usually under reduced pressure and in multiple effect evaporation plant, until the requisite concentration is obtained. As has already been mentioned, care must be taken that the evaporation temperature does not rise too high, while in addition the concentration of the glue must not rise too high, or else trouble will be experienced in slicing the slabs. The evaporated glue is poured out into galvanised iron moulds, and when solid, it proceeds to the slicing machine, the sliced slabs being dried in hot air stoves, or sheltered open-air racks until they contain about 12 per cent. of moisture. In the slicing of edible gelatin, very thin slices known as "leaves" are obtained in order to facilitate the adsorption of water on soaking, while the glue is cut to comparatively thick slabs, which are chipped up for use. Recently, however, methods have been introduced for the production of the dried glue in small rounded pellets, termed "glue-pearls" (leimperlen) or "seed glue" according to the size. The procedure is to evaporate the glue to a comparatively hard state, and while it is still liquid, allow it to drop into an inert liquid such as benzene or carbon tetrachloride. The depth of the solvent must be so arranged that the glue drops are quite hard by the time they reach the bottom of the container, whence they are withdrawn, centrifuged and dried in a current of warm air. These glue-pearls absorb as much water in half an hour as slab glue does in twenty-four hours.

A novel form of glue, concerning which but little has been heard as yet, is that known as "atomised" glue. It is obtained from the evaporated glue stock, by spraying through an atomiser into a heated and evacuated chamber, so that by the time the spray reaches the bottom of the chamber it is converted into a light dry powder, similar in character to the milk powders obtained by the same process. This form of glue is ideal for dissolving, and gelatin prepared in this way can be used very successfully in the preparation of "instant" jelly powders, etc., but it has the disadvantage that it is very bulky, and that it absorbs moisture from the atmosphere readily, with consequent spoilage.

Slab glue, after drying, is dipped into warmed water and allowed to dry again in order to give the slabs a bright finish. In most factories the slabs are hand-sorted, first into dark and light slabs and then by "tapping." In this operation the slab is struck with a small wooden hammer, good slabs emitting

a sharp, bright sound, while the defective or improperly dried ones give a dull sound.

Glue From Bone

The raw materials for the manufacture of bone glue are of varied characters. The "green" or "packer" bone from the large meat-canning factories is perhaps the best material that is available in large quantities, but "dried" or "junk" bone, steamed bone and bone obtained from garbage is also utilised. Further, the "scrim" from button factories and tinneries furnishes a very clean material for glue manufacture. It may be mentioned here, in passing, that all materials for glue manufacture, especially leather scrap, are passed through a magnetic separator to remove pieces of iron, etc., the presence of which is deleterious, both to the machinery and to the colour of the finished glue.

The bones are crushed, cleansed, and steamed in digesters for broth, which is evaporated in the same way as that from hides. The pre-treatment involves washing, degreasing the bones, and decalcifying. The degreasing is most important, since, apart from the value of the grease obtained, the presence of grease in the bones during boiling seriously injures the quality of the glue. The bones, after crushing, are extracted with a volatile solvent, on the Soxhlet principle. The choice of solvent lies between the light petroleum oils and the chlorinated hydrocarbons (carbon tetrachloride, tetrachlorethane, trichlorethylene, etc.). The latter have the advantage of being easily volatile and unflammable, with consequent diminution in the fire hazard; but they are costly, and since the bulk of material treated is large, a small percentage loss of tetrachlorethane or carbon tetrachloride means a considerable added cost to the final product. Hence, although some few factories degrease with trichlorethylene, the majority prefer the cheaper but highly inflammable petroleum fraction boiling at 100° C. It may be pointed out that the solvent should be completely volatile at 135-140° C., leaving no residue, since the last traces are removed from the bones by a current of steam at about 80 lb. pressure. The degreased bones are decalcified by maceration in dilute hydrochloric acid solution (6° Baumé), after which they are neutralised by liming, washed, dried and ground. They are then ready for the extraction of gelatin, which process sufficiently resembles, in its details, that for the preparation of hide-glue as to render description unnecessary.

Great care is taken with bone glue to keep the first and successive extraction fractions apart, as their quality differs considerably. The first fraction constitutes edible gelatin, and is of a very pale colour; the second fraction is "industrial" gelatin, part of which is utilised in the manufacture of edible preparations (e.g., confectionery), while the third and final fractions are used for glue and size.

Fish Glues

A strong glue is made from the offal and skins of fish, but its unpleasant odour militates against its extended use as an adhesive, and, of course, prohibits its use in edible preparations. The offal is well washed with water and agitated in tanks with chloride of lime, after which a further washing is followed by bleaching with a strong sulphur dioxide solution. Boiling for fish glue follows a similar course to that described above in the case of glue from hides. The glue is strong-smelling, dark in colour, a good adhesive, and well adapted to the preparation of "liquid" glues.

The preparation of fish-glue can only be undertaken during the season, when adequate supplies of offal are available. Fish glue appears in many forms; small strings or twists 15 cm. by 1 cm., large twists about 30 cm. by 2-10 cm. are the commonest forms, while leaves, strips and ribbons (often two yards long) find their way into commerce.

The Russian fish glues and gelatins are considered the best, and the gelatin from the "sounds" (air-bladders) of the fish of the sturgeon type is highly esteemed as an adhesive and clarification agent. This particular form of fish glue, known as "isinglass," occurs in crenate leaves about 25 cm. by 5 cm. and has a bleached and clear appearance. It is liable to adulteration with the dried intestines of fish, and with washed and dried beef sinews. These can be distinguished, of course, by solubility tests. Isinglass forms the basis of a large number of adhesives, among which may be mentioned China glue, a very strong glue used for joining morocco leather, and the solid glue-sticks used for the sticking of small paper articles.

Typical formulæ for these glues are:—

China Glue.		Glue Sticks.	
Isinglass	24 parts.	Isinglass	16 parts.
Methyl alcohol	96 "	Gelatin	8 "
Water	48 "	Sugar	10 "
Gum arabic	3 "	Water	40 "
		Alumina	5 "
		Flavouring (essence of cinnamon)	A trace.

A peculiar glue is obtained from shell-fish which has been found incomparable for the manufacture of synthetic pearls and artificial mother-of-pearl. The shell-fish are dried, ground to a powder, extracted with acetic acid, and treated for glue by digestion at 2 atmos. pressure for twenty-four hours.

It is impossible, and unnecessary, to enumerate all the commercial grades of glue, for their number is legion. Adulteration in glue is very common, good glues being diluted with inferior qualities, and new parcels with stale stock. A very fine, pale glue (Grenetine) is obtained from young calf skins, treated as soon as possible after slaughter, while a highly valued glue is obtained from fresh veal sinews. "Russia" glue is very dark in colour, but has great strength and is preferred in joinery, while "Tub" glue is a slightly evaporated glue stock preserved in the liquid state by a disinfectant, usually zinc sulphate.

The Properties of Glues

Glue itself is a mixture of gelatin with chondrin and water, together with the breakdown products of gelatin obtained in the boiling of the glue. Analyses of pure gelatin are remarkably constant and nearly always approximate to:—

Carbon	49.5 per cent.
Hydrogen	6.85 "
Nitrogen	18.70 "
Oxygen and sulphur	24.75 "

Whether or not we are justified in assuming from this constancy in the composition that gelatin is a definite chemical substance is a matter of opinion. There is no doubt that gelatin contains a large number of amino-acid units, but it is impossible to say whether they are in combination as one definite substance, or whether there are a large number of gelatins, all very slightly different. An analysis of gelatin for amino-acids by Dakin gave:—

Amino-Acid	Percentages
Glycine	25.5
Alanine	8.7
Leucine	7.1
Phenylalanine	1.4
Tyrosine	Trace
Serine	0.4
Proline	9.5
Oxyproline	14.1
Aspartic acid	3.4
Glutamic acid	5.8
Lysine	5.9
Arginine	8.2
Histidine	0.9

The chemical properties of glue and gelatin are not very clearly defined, but among the most interesting is the behaviour with salt solutions. Substances such as magnesium sulphate, neutral potassium tartrate and potassium and sodium carbonates precipitate the gelatin, while compounds such as barium, sodium and ammonium chlorides, with neutral potassium chromate prevent the setting of the gelatin solution on cooling. The susceptibility of gelatin towards tannins, by which it is precipitated, renders it peculiarly fitted for the clarification of liquors, while the sensibility of chromated gelatin to light rays (rendering it insoluble) gives rise to a method of photographic printing.

Examination and Testing of Glues

The evaluation of glue or gelatin is more a matter of experience than of chemical skill. Chemical examination of the glue tells but little about it, so that recourse to an examination of the physical characteristics of the sample is necessary. Numerous instruments have been devised for testing the strength and gelling powers of glue and gelatin, some of which are described later. It must, however, be realised that there are no really critical tests, and that all examinations are (or should be) comparative; tests on the glue in question being

done side by side with tests on a standard glue, with the properties of which the investigator is thoroughly familiar. The following points about a glue or gelatin are worthy of detailed examination:—

1. Externals, appearance, smell, etc.
2. P_h value.
3. Viscosity.
4. Fusion point.
5. Gold number.
6. Mechanical strength.

The appearance of a glue or gelatin is often deceptive. A pale clear glue may often have weaker adhesive powers than a dark cloudy sample, while in other cases the reverse may be true. The presence of a bright surface should always be looked for, since the presence of grease (from improperly degreased bones) both lowers the value of the glue and renders the surface dull. The smell will often tell the source of the glue, and in this way may indicate adulteration, while all glues should be examined for clouds of tiny bubbles of gas entangled in the substance of the cake. This indicates a "last" fraction, or long boiled glue, or one from putrefactive sources, and is usually sufficient cause for the rejection of a sample.

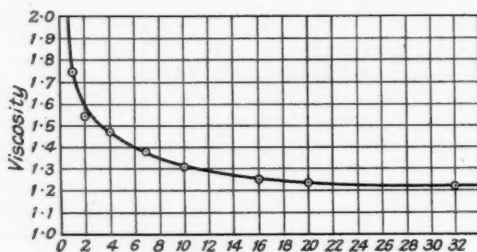


FIG. 1.

Moisture and ash are, of course, obvious values for determination. Excessive moisture means dilution of value, and a high ash content often implies a "last" fraction. The presence of an undue proportion of albuminoids in the glue is injurious. They can be estimated by precipitation with zinc sulphate. The washed precipitate is examined quantitatively for ammonia by the Kjeldhal method. The ammonia content multiplied by 5.33 gives the amount of albuminoid present.

The P_h value is a useful criterion, and should be determined by the electrometric examination of a 1 per cent. aqueous solution of the glue (or gelatin) which has not been heated above 70° C. It has been found that a glue with a P_h value round about 4.5-4.7 has a low viscosity and small adhesive value, but that as the P_h value increases or decreases on either side of 4.5 so the quality of the glue increases, the optimum values being $P_h = 3.5$ and $P_h = 9$. Thus a glue which is neutral to methyl red will be of inferior quality, while glues which are:—

- (a) Acid to benzene-azo-naphthylamine and alkaline to thymol blue (i.e., P_h 2.8-3.7),
 or (b) acid to thymol phthalein and acid to α -naphthol phthalein (i.e., P_h 8.7-9.3),
 are likely to be of good quality.

The viscosity of a glue solution is not easy to determine with rapidity, although the various instruments recently described for testing the viscosity of viscose solutions, etc., can easily be modified by the addition of a warm water jacket to find the viscosity of glues. The rough rule that a viscous glue will stick better than a thin glue is fairly well upheld in practice, and it is found that for glue solutions there is a "critical" viscosity below which the solution is useless as an adhesive. This latter question is more one of dilution of the solution than quality of the glue. More important is the effect of boiling and agitation on the glue, as measured by the change in viscosity. Boiling for any length of time deteriorates the value of a glue, and the change in viscosity is a measure of this deterioration. In Fig. 1 there is shown graphically the alteration in the viscosity of a glue by ordinary boiling in an open pan. Agitation of the glue also lowers the viscosity, so that both prolonged boiling and agitation are to be avoided.

Electricity in Chemical Industry

Production of Cyanamide

MR. A. E. MALPAS, president for the session, gave an address on "Electricity in the Arts" before the Mersey and North Wales (Liverpool) Centre of the Institution of Electrical Engineers on Monday, November 2.

He said that one of the most important processes involving the use of the electric furnace was that of the carbides, notably calcium carbide, which was the starting-point of a whole series of compounds. The largest outlet for calcium carbide was in the manufacture of cyanamide. Other derivatives were cyanide, $\text{CaCN}_2 + 2\text{NaCl} = \text{CaCl}_2 + 2\text{NaCN}$, which was used for the extraction of precious metals and for fumigation. The capacity of the American Cyanamide Co. at Niagara Falls was 75,000 tons per annum, and other important plants were operating in Germany and elsewhere. The world capacity for the production of cyanamide was estimated at about 300,000 tons per annum. Probably the largest product from cyanamide was a nitrogenous fertiliser which competed with Chile saltpetre. Ammonia was also obtained— $\text{CaCN}_2 + 3\text{H}_2\text{O} = \text{CaCO}_3 + 2\text{NH}_3$ —by heating under pressure in the presence of an alkali. Nitrates would be produced by the oxidation of the ammonia by means of the Ostwald process. By the oxidation of atmospheric nitrogen it was possible to combine the two constituents of the air directly to form nitric acid.

In the Haber process nitrogen and hydrogen were combined directly to form ammonia by means of a suitable catalyst, thus $\text{N} + 3\text{H} = \text{NH}_3 + 11,900$ calories. The Ostwald process was originally an electric process for oxidising ammonia to nitric acid, $4\text{NH}_3 + 5\text{O}_2 = 4\text{NO} + 6\text{H}_2\text{O}$, the nitric oxide on cooling and treating with water giving nitric acid.

As the result of Sabatier's work on the hardening of oils by means of hydrogen, the demand for hydrogen had largely increased. This was met partly by electrolytic methods, and also by the Lane steam iron process. Knowle's cells capable of absorbing 20,000 k.w. and producing 8 tons of hydrogen per day, were at work, not only in England, but in France, Italy, Russia, Chile, and other countries. With energy costing 10d. per k.w., the cost of hydrogen worked out at 1d. per metre cube for the power work. In the production of chlorine electrolytically, three types of cells were being used, the flowing cathode, the bell type and the diaphragm type. To-day, Mr. Malpas said, it was more the practice to use liquid chlorine, thus displacing the more cumbersome bleaching powder methods of transportation of the gas.

Edgewood Arsenal Plant

The largest installation in the world was said to be the plant put down by the U.S. Government at Edgewood Arsenal, where 3,500 Nelson cells were installed for war purposes to give 100 tons of chlorine per day and the equivalent of caustic soda. Other products such as hypochlorates, chlorates and perchlorates, were also obtained. Cells used for extraction of sodium, calcium, magnesium, and aluminium, worked with a fused electrolyte at temperatures ranging from 300° upwards. The Castner sodium cell used fused caustic and worked at about 320° C. Cells for the production of magnesium had, it was said, been operated by the Magnesium Co. at Wolverhampton, giving an output of 100 lb. of metal per twenty-four hours.

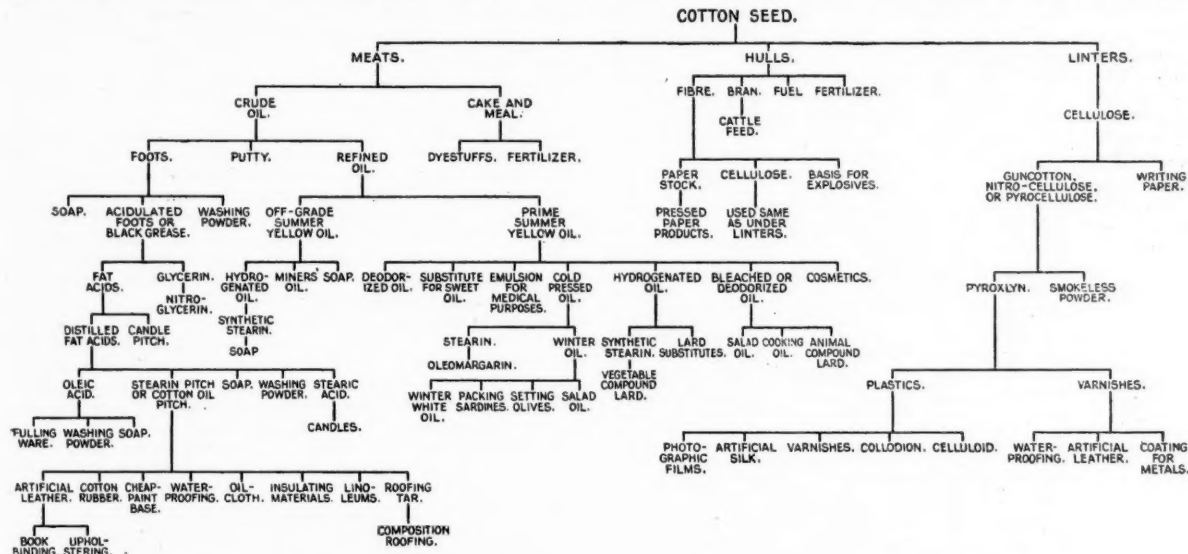
The Future of Magnesium

It was thought that magnesium had a future before it for the production of light alloys and that it might some day compete with aluminium. Crude bauxite contained about 60 per cent. of alumina and to refine it sufficiently for use required eight tons of coal per ton of finished metal. The refining process consisted in treating the crude ore with caustic soda and filtering and roasting. Each ton of metal required 25,000 k.w., so that at 10d. per k.w. the cost for current came out at £10 per ton. The carbon was supplied largely by the amorphous carbon anodes used. The working temperature was about 1,000° C. The molten aluminium sank in the bath and was run off. The installations of the British Aluminium Co. and the Aluminium Corporation, when fully loaded, should, Mr. Malpas thought, be able to produce some 36,000 tons per year. It was very necessary, if this country were to meet competition, that electro-chemical industries should be encouraged by reduced power costs.

Chemical and Other Products from Cotton Seed

It is claimed by a recent writer on the American cotton seed industry in the *Manchester Guardian Commercial* that every part of the raw material is now commercialised except such dirt as adheres to the seed during the harvesting period. The basic derivatives from cotton seed are linters, hulls, and meats. Delinting, by means of specially constructed saws, represents the first process after the seed reaches the mills. The resulting product is known

the exclusion of woodpulp, and will require annually about 100,000 bales. Some of the big foreign producers are likewise increasing the use of linters, and a large percentage of exports of the latter find their way into rayon yarns. Thus a much broader field is being opened for them, and they promise to come into closer competition with lint cotton on this account. Oil is the most valuable product of the "meats" derived from cotton seed. This is clear from the fact that, during the past



Further Volumes in the Chemical Engineering Library

Reviewed by Professor E. C. Williams

The six volumes under notice are further contributions to the second series of the Chemical Engineering Library (London: Ernest Benn, Ltd. Each volume, 6s.). In addition to those reviewed below, two other volumes have just been published, "The Design of Chemical Plant," by Dr. Weyman, and "The Chemistry of Power Plant," by W. M. Miles. The series is designed "to cover the whole science and practice of the subject, putting each specific section in the hands of a specialist author."

THESE volumes will be welcome to the increasing number of students and chemical manufacturers who wish to obtain a rapid insight into the present position of a particular branch of chemical engineering, but it would be optimistic to regard them in any way as specialist treatises for the trained chemical engineer or works chemist. The series is excellently printed and, as is usual with Messrs. Benn's publications, the line drawings and diagrams are particularly well reproduced.

THE DUST HAZARD IN INDUSTRY. By W. E. Gibbs, D.Sc.

An exhaustive and timely review of the dangers to industrial workers and property arising from the inhalation or explosion of material in a fine state of division. Chapter II contains definitions of dusts and a description of the main sources and properties of finely divided materials generally. It deals with such important fundamental properties as increased chemical and physical activity, electrical charges, the adsorption of gases by dust particles, and the stability of dust suspensions. Chapters IV to VI deal from a scientific standpoint with the fundamental characteristics of a great number of gases and dusts as they affect explosibility in an oxidising atmosphere. Recent work on the propagation of flame, limiting explosive concentrations of dust and oxygen, ignition temperatures and explosion pressures, and the influence on the explosibility of the addition of inert dust or gas to the mixture is well summarised. The above chapters are devoted to the scientific and experimental side of the problem. The practical side, the prevention of explosions in factories, is no less thoroughly handled. The commonest sources of explosive or otherwise harmful dusts in a large number of different industries are discussed together with the usual origin of electric sparks and other causes of ignition. Practical means of prevention, or methods for localising the effects of an explosion once started, are discussed in detail with simple and clearly reproduced drawings of large scale installations. The problems of dust explosions in mines receive special attention in the final chapter.

Occupational diseases arising from inhalation of dust are mainly matters for medical authorities, but since the real cure lies in the first instance with the chemical engineer or plant manager, it is necessary that they should have an accurate knowledge of the physiological effects of various dusts. This subject is briefly and satisfactorily dealt with in the third chapter.

SULPHURIC ACID REACTION CHAMBERS. By P. Parrish, A.I.C.

A thoroughly practical book dealing more especially with the construction, methods of erection, working, and demolition of sulphuric acid chambers. The details given of arrangement of plant and methods of assembling are so comprehensive that the novice will be tempted to try his hand at building a factory without more ado. The theory of the chamber process is not so thoroughly dealt with, being dismissed in a little more than three pages, into which at least two misprints in chemical equations have crept.

Apart from the immediate value of the book from the point of view of the sulphuric acid manufacturer it provides a wealth of sound instruction on the technique of building large plants in lead. The book, for this reason alone, would be very acceptable. Recent plant developments designed to reduce the space-time contact of the chamber process are noted, and the Opl, Benker Millberg, "Metro" bubble tank and Quinan Plants are briefly described. Attention is rightly drawn to the fact that whereas the old plants with large space-time factors practically ran themselves, modern plants with intensive working may cause sleepless nights even to an expert operator, but this in the reviewer's opinion should not stand in the way of progress along these lines. The author discusses the fundamental principles governing the interrelation of plant units and the factors governing the design of plants—a difficult subject when the functions of different units of the

plant may overlap to a considerable extent. The book in a very limited compass presents a large amount of really practical information and will be widely read.

AUTOClaves AND HIGH PRESSURE WORK. By H. Goodwin, M.Sc.

This book is an excellent collection of sound practical advice to any young technical chemist about to carry out his first work under high pressure conditions, either in the laboratory or works. It will fill a niche not hitherto filled by any English publication, with the possible exception of a chapter on autoclaves in the translation of Fierz's well known book on dye chemistry. It is easily and in places conversationally written, and though the author shows signs of wandering at times, he usually wanders interestingly and usefully. He obviously speaks from experience. The book is replete with valuable wrinkles which are exactly what the young chemist wants but cannot usually obtain in the literature. Six chapters are devoted to descriptions of various types of autoclaves for laboratory, semi-large scale and large scale operations. The author rightly draws attention to the utility of autoclaves, built of comparatively thin steel plates for pressures up to about 10 atmospheres. There are many works to-day using heavy and expensive cast steel autoclaves to withstand pressures of only 5-6 atmospheres. In Chapter VII, on heating of works autoclaves, the author gives perhaps an undue weight to coal firing and disposes of gas firing in twenty lines.

The last two chapters on the working of individual autoclaves, the lay-out of the subsidiary plant, and the arrangement of plant working programmes are altogether sound and well worth attention, but there must be something wrong on a plant when the workmen prefer the horrible task of breaking up rock caustic soda with sledge hammers to charging with the excellent flake caustic which has been on the market for several years.

The book limits itself entirely to the types of autoclaves commonly used in the dyestuffs intermediate industry. Under the title of high pressure work the author might well have included a description of some of the excellent technique developed by certain of the continental fuel research institutes, while the most outstanding example of industrial high pressure operation—the manufacture of synthetic ammonia—including the use of reaction chambers, scrubbers, purifiers, pipe lines, heat exchangers and pumps, is not mentioned at all. A chapter on the compression of gases would make a valuable addition to the book in view of recent industrial developments in many directions. It is an excellent little book, well illustrated, and certain to be much sought after.

THE THEORY AND PRACTICE OF COMBUSTION. By J. E. Lister and C. H. Harris.

This volume contains very little theory beyond a most elementary discussion of the combining weights of carbon with oxygen and a statement of the thermal values of the oxidation of carbon. The bulk of the book consists of a general description of various fuels and of some typical furnaces and recording instruments. There are also descriptions of a few standard boiler settings for liquid, solid, and gaseous fuels. This treatment might be satisfactory if it had not already been done a dozen times before, but it will undoubtedly prove of value to the works chemist who has little knowledge of fuel and allied matters.

MECHANICAL MIXING MACHINERY. By L. Carpenter, B.Sc.
AGITATING AND STIRRING MACHINERY. By Hartland Seymour.

These are two volumes of a very useful type which will serve their purpose in bringing before the young works chemist the large variety of mechanical devices now employed for the apparently simple operations of mixing and agitating. There is naturally a good deal of overlapping between the two volumes since agitating is simply a special form of mixing.

Generally *Mechanical Mixing Machinery* deals with the mixing of two solids, *Agitating and Stirring Machinery* with two liquids, and both of them with the mixing of a solid and liquid. There is nothing that calls for special comment in either volume; naturally they cannot be exhausted in 130 pages, but both books give a general bird's eye view of the different types of plant available and discuss the suitability of the various types for particular purposes. There is no appreciable amount of theoretical or experimental work mentioned in either book.

E. C. W.

Reviews

COPPER. By N. E. Crump. London: William Rider and Son. Pp. 246. 10s. 6d.

This book is not only well arranged but contains much information of interest alike to the chemist and the metallurgist. Its purpose is "not so much to present a specialised account of any aspect of the copper industry . . . as to survey the ground generally," and the author has succeeded in presenting details in such a way that this theme is never obscured. The book is divided into two parts—the first dealing with the treatment and uses of copper and the second with the sources of supply, in the last respect the arrangement following closely on that of *The Tin Resources of the British Empire*, a previous volume in this useful series devoted to "The Raw Materials of Industry."

The author traces the development of smelting and refining, describing the various processes in detail and discussing their relative merits. The chapter dealing with the uses of copper shows that its principal application is in electric cables and water-tube boilers, but it is interesting to note that, while its use in cooking and similar vessels has almost entirely been replaced by tin and aluminium, a large export trade is done in copper sheets to the East for this purpose, and that in Egypt the majority of household utensils are still beaten out of the metal. An admirable summary of copper production and prices covering both the raw material and the goods made from it shows that the ore imports into this country are still lower than in 1913. While the decrease that took place during the war was due to the shortage of ship space, metallic copper being imported instead, the continued decrease is disquieting, but the author concludes his summary of the position with consolation contained in the old mining proverb that a man may still "become wealthy when he finds a good copper mine."

Although the United States control about three-quarters of the world's production of the red metal—having secured a dominant interest in the South American, Mexican and even Canadian fields—it is encouraging to read that "the future of copper mining in Australia will be even greater than its past history," while in Canada production is again increasing, as evidenced by the statistics of recent years. That the tendency is likely to continue is confirmed by a report just issued by the High Commissioner for Canada, stating that "it is expected the production during the current year will largely exceed that of any previous year." Much of the information in this book is not original, but this really proves to be an advantage. It is probably because the author has collected his facts from a wide variety of sources that the whole is such an excellent survey of the copper industry.

J. A. B.

THE ALKALI INDUSTRY. By J. R. Partington, D.Sc. Second edition. London: Baillière, Tindall and Cox. Pp. 336. 12s. 6d.

The alkali industry is an important one, covering, as it does, a fairly wide field, which involves something more than a superficial knowledge of chemistry, physics, and chemical engineering. In the past the classical work of Lunge on *Sulphuric Acid and Alkali* has constituted a fund of valuable information of a practical character. Time, however, revealed the necessity for a concise yet connected treatise which would enable students and others interested to obtain a "picture" not only of the ramifications of this industry, but an idea of its relationship to pure science. This want was supplied by Professor J. R. Partington's volume, and it is safe to say that the author's prestige has become more firmly established than ever. The fundamentals of the technology of the alkali industry are set out in a clear way, scientific principles are

expounded with commendable lucidity, and the application of the law of mass action and the principles of thermo-dynamics to the peculiar problems involved are never lost sight of.

The industry, in some respects, has undergone a distinct change since the first edition was published in 1918. The Leblanc process is now only of interest from the point of view of saltcake production. Soda ash (sodium carbonate) and caustic soda are now almost wholly produced by the ammonia-soda process or the electrolytic method. The book deals suitably with these modern tendencies, and indeed, in some instances foreshadows the trend of economic and technical development.

A useful bibliography is provided at the end of each chapter, and it is certain that Dr. Partington's latest production will appeal to all those who are keenly interested in the alkali industry.

P. P.

THE SCIENCE OF SOILS AND MANURES. By J. Alan Murray, B.Sc. Third edition. London: Constable and Co. Pp. 12s. 6d.

That our knowledge of the sciences concerned with soils and manures has developed is evident from a perusal of the new edition of this book. Chemistry and chemical engineering have led to a more economical production of artificial fertilisers, and just as synthetic processes for the production of ammonia and urea have created a deep impression recently, so the advance of knowledge on the subject of hydrogen-ion concentration of soil solutions, its effects on the growth of crops, and the micro-organisms on which fertility depends, have been no less significant and impressive. In connection with the chemistry of soils, it is remarked that "it is now recognised that Dyer's method (of determining the manurial requirements of the soil from the amount of 'probably available' plant food) is a conventional one, and that results have, at best, only a comparative value. It is generally accepted that solution and ionisation is a condition precedent to the absorption of solids by plants, and that the 'available state' can be defined only in terms of solubility. Solubility is not only dependent upon the chemical and physical state of the body, but also upon the nature of the solvent. The law of diminishing returns call for treatment, and valuable observations are also to be found concerning lime, soil solution, absorption of salts by soils, reaction of soil solution, and humus."

Four chapters are devoted to phosphatic, phospho-nitrogenous, nitrogenous and potash manures, and finally, general and farmyard manures come under treatment. Generally, there is evidence of careful revision and of an attempt to maintain the book up-to-date. There appears to be only one respect in which the author has failed to keep abreast of current development. He remarks on page 192 that "with the exception of ammonium chloride, ammonium nitrate, and the more recently introduced nitrolim, it (sulphate of ammonia) is the most concentrated of all nitrogenous manures." What about urea, which can now be obtained in abundance both in Europe and in America?

P. P.

INDUSTRIE DER FETTE UND SEIFEN. By Dr. O. Steiner. Dresden and Leipzig: Steinkopff. Pp. 83. 4 marks.

This little volume deals with the recent literature on the technical synthesis of fats, industrial production, purification, bleaching, hardening and saponification. An important section is devoted to the raw materials of soap, manufacture of transparent soaps, soap powders, special soaps, detergent value of soaps, plant and machinery, etc. The book merely indicates processes and results and, of course, does not enter into details, but chemical literature is so extensive that every chemist will derive much benefit from this valuable little guide to modern publications.

S. P. S.

MINERALÖLE. By Dr. Egon Eichwald. Dresden and Leipzig: Steinkopff. Pp. 151. 6 marks.

The book forms a brief synopsis of the progress in various branches of the study of mineral oils. Their origin, methods of producing, constitution, analysis, distillation, cracking, purification, by-products, chemical transformation, properties and applications are discussed with the aid of numerous patents. The volume is intended for the expert; it only serves as a guide to the literature of the subject, not as a textbook. It is a very useful manual for the study of recent advances, and should prove of assistance to oil chemists. S.P.S.

The Chemical Analysis of Petroleum

Methods Discussed by Experts

A MEETING of the Institution of Petroleum Technologists was held on Tuesday, at the Royal Society of Arts in London, the chair being taken by Sir Thomas Holland, F.R.S.

In a paper on "The Determination of Unsaturateds in Petroleum Spirit," by Dr. W. R. Ormandy and Mr. E. G. Craven, it was pointed out that the term "unsaturateds" in this connection had a restricted meaning, being confined to those hydrocarbons containing one or more double bonds which absorbed bromine readily under the conditions of the usual tests, such as those of Hanus or Wij. No satisfactory method appeared to have been devised for the determination of the proportion of unsaturated hydrocarbons present in a given sample of petrol. The main ideas in their work were as follows. Firstly, assuming the unsaturateds present to be mono-olefines, each molecule should absorb two molecules of bromine. If therefore the molecular weight and the bromine absorption of the unsaturateds were known, an estimation could be made of the proportion of unsaturateds present. Secondly, if from the total loss in strong sulphuric acid the aromatic content were subtracted, the difference should be the unsaturateds. In regard to the first idea the Hanus test was used, and it was found for a particular spirit that on fractionating, the bromine absorptions showed that the unsaturateds appear to be fairly evenly spread over the various fractions. For the determination of mean molecular weight it was assumed that this could be taken as of the same order as that of the whole spirit. The acid losses presented no particular difficulty. Where possible, 100 c.c. of spirit were weighed into a funnel, shaken for half an hour with 300 c.c. of acid, and allowed to stand overnight. The residual spirit was tapped off carefully and weighed. Aromatics were determined by the modification of the Tizard-Marshall method, in which the difference of the aniline point of the spirit after washing with three volumes of 80 per cent. H_2SO_4 and an equal quantity of 98 per cent. H_2SO_4 was taken as the change of aniline point due to removal of aromatics.

Determination of the Molecular Weight

In the course of some work involving the determination of the molecular weight of petroleum fractions by the Victor Meyer method, it was noticed that erratic results were obtained when the temperature of the bulb was high. It was thought at first that this was due solely to the cracking of the liquids, since it was observed that the displacement of air took place in distinct jerks, and a slight brown film, presumably "carbon," was left on the small tubes in which the liquids were weighed (benzene excepted). Further work has shown that, whilst cracking does undoubtedly take place, either this is accentuated by the presence of air or actual combustion of a portion of the hydrocarbons occurs.

From experiments undertaken the practical conclusion to be drawn was that the use of coal gas or hydrogen atmosphere was advisable in determinations of molecular weights of petrols by the Victor Meyer method, and also some light was thrown upon the reactions which occur when the air atmosphere is not so replaced by hydrogen. The brown deposit on the weighing tubes might indicate that polymerisation and asphalt formation took place, and, in addition, it appeared to be clear that cracking or partial combustion occurred, particularly whilst the spirit remained liquid, the vapours apparently being much more stable.

High Vacuum Distillation

In a paper on "The Principles of the High Vacuum Distillation of Mineral Oils," Mr. Leo Steinschneider said that probably no other system of distillation had won such rapid and widespread popularity, nearly all the large refineries in Europe and the United States, as well as in India, having introduced high vacuum plant.

The principal worth of high vacuum distillation consists in that it is precisely the inferior, heavy asphaltic oils (the conversion of which into heavy lubricating oils was unprofitable and frequently impossible), which are the most advantageous for high vacuum distillation, as all the fractions, even the heaviest cylinder oils, are won as distillate (overhead distillates) and not as residuum (bottoms). Only the asphalt—a superior coke-free material—remains in the still. Paraffinoid oils can also be distilled with equal advantage. As far as

present knowledge went, the future in this domain would appear to belong to the centrifugal, but it was emphasised that oils containing crystalline paraffin, as won in ordinary distilling plant, cannot be deparaffined by centrifugal apparatus. As compared with distillation without vacuum, the advantages of high vacuum distillation might be summarised as follows: economy in fuel oil consumption, about 50 per cent.; extra yield in distilling and in refining, about 4 per cent. in each case; saving of sulphuric acid, 50 to 75 per cent.

It had also been proved beyond question that all products possess better physical properties, safety in operation is greater, as, due to the vacuum, leakages cannot occur, and repairs are practically never necessary, and in every instance these advantages had covered the total capital outlay in less than one year.

Sulphur Dioxide as Oxidising Agent

Birmingham S.C.I. Meeting

DR. D. F. TWISS, chief chemist to the Dunlop Rubber Co., and chairman of the Birmingham and Midland Section of the Society of Chemical Industry, presided at the opening meeting of the session at Birmingham last week. He made reference to the loss sustained by the section in Professor G. T. Morgan's departure from Birmingham to take up his duties as Director of the Chemical Research Laboratories at Teddington. During his Chairmanship, Professor Morgan had given whole-hearted service, and, as a section, they desired to express to him their best wishes. They greatly appreciated the public-spirited interest shown towards the Society by other members of the University staff, and cordially welcomed Dr. Wardlaw and Mr. Carter, both of whom had, in previous years, done excellent work.

"The Behaviour of Sulphur Dioxide in Acid Solutions" was the subject discussed, two papers being read:—"The Oxidising and Reducing Action of Sulphur Dioxide on Solutions of Metallic Salts," by W. Wardlaw, D.Sc., F.I.C. (Chemical Department, Birmingham University); and "Some Physico-Chemical and Electro-Chemical Aspects of Sulphur Dioxide as an Oxidising Agent," by S. R. Carter, M.Sc., F.I.C.

DR. WARDLAW said that sulphur dioxide is so well characterised as a reducing agent and so extensively employed for purposes of reduction, both in the laboratory and in technical operations, that its oxidising properties had been somewhat neglected, although in the manufacture of sodium hyposulphite and its related products, the formaldehyde sulphonylates, the oxidising possibilities of sulphur dioxide were applied commercially. In connection with the oxidising action of sulphur dioxide on metallic salts, a case of interest to all analytical chemists is that of the iron chlorides. The reduction of ferric chloride by sulphur dioxide was utilised in both qualitative and quantitative analysis. But this reduction was not complete in strongly acid solutions. Experiments by Smythe and Wardlaw, and, later, in conjunction with Carter and Clews, showed that ferrous chloride could be oxidised by sulphur dioxide in the presence of high acid concentrations. A similar equilibrium could be realised in the case of copper chlorides, which was investigated by Wardlaw and Pinkard, but, in this case, it was possible, under certain conditions of acidity, to obtain cuprous sulphide as the precipitate. It was also shown that equilibrium conditions could be established in the case of the phosphates of iron in the presence of phosphoric acid and of molybdenum salts in the presence of concentrated sulphuric acid. It was supposed that, in the case of solutions containing a large number of hydrions, sulphur dioxide is capable of ionising to an extremely minute extent as a base, but an alternate view was that the reaction was not ionic, but molecular, and many results seemed to support this theory.

MR. CARTER pointed out that certain determinations of the oxidation-reaction potentials showed that the effect of raising the concentration of acid was to increase the oxidising power of sulphur dioxide. Other experiments showed that ferrous-ferric salts became better reducing agents in hydrochloric and phosphoric acids respectively. The potentials of cuprous-cupric salts were less than those of the ferrous-ferric salts, and gave a maximum in 6-normal hydrochloric acid. These results agreed with quantitative experiments.

Electrolytic experiments suggested that reduction of sulphur

dioxide solutions did not proceed to sulphur direct, but through the formation of an intermediate compound. Kinetic experiments on the interaction of sulphur dioxide with ferrous phosphate in phosphoric acid solutions revealed two distinct changes—an initial rapid stage followed by a slow and almost uniform change. This could be explained by assuming a reaction in which the sulphur dioxide gave rise to an intermediate compound, and a second reaction in which this decomposed, giving sulphur.

Society of Public Analysts Meeting

Abstracts of Papers

An ordinary meeting of the Society was held at the Chemical Society's Rooms, Burlington House, on Wednesday, November 4, Mr. S. F. Burford, vice-president, in the chair.

A paper was read by Messrs. G. D. Elsdon, F.I.C., and Percy Smith, B.Sc., on "The Determination of Palm Kernel Oil and Butter in Margarine." The authors have determined the Reichert, Polenske, and Kirschner values of a series of mixtures of palm kernel oil and butter fat in mixtures of other oils and fats in continuation of their previous work on this subject. (*Analyst*, 1925, 50, 53.) Their results are given in a series of tables and compared with the previous results of Bolton, Revis, and Richmond. The authors recorded that the differences between the calculated and observed values for these figures are very much less in the case of palm kernel oil than in the case of coconut oil, and it was also suggested that the relationship between the Reichert and Polenske value of a given mixture may assist in deciding on the relative proportions of palm kernel oil and coconut oil present.

In dealing with the subject of "The Determination of Alcohol and Ethyl Chloride in Chloroform," Dr. Clive Newcomb, F.I.C., said that methods have been devised for determining alcohol and ethyl chloride in anaesthetic chloroform and of removing them, so that the degree of purity of the residual chloroform can be ascertained from its physical constants. Alcohol is removed by washing the chloroform with water in a special apparatus, and by determining the density of the chloroform before and after the washing a measure of the amount of alcohol is obtained, whilst the difference between the density of the washed chloroform and that of pure chloroform affords a measure of the amount of ethyl chloride. By boiling the chloroform with potassium hydroxide solution under specified conditions the ethyl chloride is removed, and if the residual washed chloroform has the right density for the pure substance, it is unlikely that other possible impurities are present. Experiments showing the influence of the washing on the various substances in chloroform, and the effect of water, alcohol, ethyl chloride, and other substances on the density of chloroform, were described.

Determination of Soluble Sulphates

Mr. H. Atkinson, A.I.C., submitted a paper on "The Volumetric Determination of Soluble Sulphates by means of Barium Chloride and Potassium Stearate," in which he said that sulphates in fairly dilute solution can be determined by precipitating them with excess of standard barium chloride solution, and titrating this excess with standard potassium stearate solution, the end point being shown by B.D.H. universal indicator. In volumetric titrations the end point is reached before the theoretical amount of barium chloride has been added, and this discrepancy varies with varying concentration, but is constant for equal concentrations, so that corrections, obtained by comparison with standard sulphate solution, can be applied. Metals forming insoluble stearates (e.g., aluminium, zinc, calcium, magnesium) are removed by precipitation with the potassium stearate solution prior to the titration of the sulphate. The limit of error in the method is of the order of 0.05 c.c. of a 0.1 N solution.

Certificates were read for the first time in favour of Messrs. J. D. Barrett, B.Sc., A.I.C.; A. F. Lerrigo, B.Sc., F.I.C.; O. A. Mendelsohn, B.Sc., H. E. Monk, B.Sc., A.I.C., and E. Voelcker, A.R.C.S. Certificates were read for the second time in favour of Messrs. A. Bruce, B.Sc., F.I.C., F. J. T. Grigg, M.Sc., A.I.C., S. G. Clarke, B.Sc., A.I.C., J. Hanley, F.I.C., A. J. Jones, A.I.C., H. W. Lawrence, F.I.C., F. Mattingley, B.Sc., A.I.C., B. F. Sawbridge, M.A., F.I.C., H. J. Stern, Ph.D., B.Sc., A.I.C., and Major C. Newcomb, M.D., F.I.C. Mr. Theodore Rendle was elected a member of the Society.

Oil Research at Birmingham

A New Experimental Plant

An interesting statement on fuel research work at the University of Birmingham has just been issued by the authorities. A large new building, which is to form the headquarters of the Department of Oil Engineering and Refining, will be opened in the near future. The site is in close proximity to the three drilling rigs, and the department will include students' and research laboratories, a lecture theatre, a drawing office and a museum. Small refining plant, similar to that used in the experimental laboratories of the large refineries, has also been provided, so that the whole process, from the production of oil to refining of the finished product, can be carried out on a small scale at Edgbaston in exactly the same manner as would be done in the industry. Those studying to become petroleum production engineers, chemical engineers, or refinery chemists are, it is claimed, thus able to receive the complete training they require; petroleum geologists also, if desirous of obtaining full knowledge of other branches of the industry, can take a course in the department.

A New High-pressure Chamber

The high-pressure chamber is now completed and is being fitted with special apparatus of an expensive kind, and it is hoped that the Oil Department will be able soon to commence investigations into the practicability of extracting oil from coal and other bituminous matter. These have been engaging attention for some time past, and may be said to supplement experiments carried out under the auspices of the Fuel Research Board. It is principally the problem of the origin of petroleum, the best methods of obtaining a synthetic substitute for natural mineral oil, the properties and the refining of tars obtained by the carbonisation and berginisation of bituminous coal, cannel coals, etc., which are being studied at Edgbaston. As some of these investigations necessitate working at exceedingly high pressures (of the order of 2 tons to the square inch), it is considered too dangerous to carry out the requisite experiments in an open laboratory. The new high-pressure chamber is situated in an isolated spot, and has been constructed in such a manner that the outer wall and the roof will take the full force of any violent explosion which may occur, due to their being weaker than the main building, and the operators will control the experiments in a special bomb-proof shelter.

Dyestuff Licences for October

THE following statement relating to applications for licences under the Dyestuffs (Import Regulation) Act, 1920, made during October, has been furnished to the Board of Trade by the Dyestuffs Advisory Licensing Committee.

The total number of applications received during the month was 638, of which 526 were from merchants or importers. To these should be added 45 cases outstanding on September 30, making a total for the month of 683. These were dealt with as follows:—Granted—537 (of which 486 were dealt with within seven days of receipt). Referred to British makers of similar products—98 (of which 79 were dealt with within seven days of receipt). Referred to Reparation Supplies available—14 (all dealt with within two days of receipt). Outstanding on October 31, 1925—34. Of the total of 683 applications received, 579, or 85 per cent., were dealt with within seven days of receipt.

Increased Oil Production

SIR CHARLES GREENWAY, chairman, speaking at the general meeting of the Anglo-Persian Oil Co. in London, on Tuesday, said that the policy of extending the oil bearing territories had been very successful, and the production figures showed for 1924-25 4,333,933 tons, against 1,106,415 tons for 1918-19. Progress in refineries had been maintained, and a greater variety of products had been manufactured. The refinery of their associated company—the Commonwealth Oil Refineries, Ltd., was operating satisfactorily. The company had a million pounds holding in Scottish Oils, Ltd., and conditions there were very serious as the result of continued disputes and decline in market values, but the department of Scottish Oils which was refining Persian oil and marketing the product was giving satisfactory results.

The retiring directors were re-elected.

Sulphur Content in Wool

An Estimation of Quantity

THE second meeting of the Nottingham Section of the Society of Chemical Industry was held on Wednesday, November 4, when two papers were read.

The first described an investigation of the nature of wool protein by S. R. Trotman, F.I.C., E. R. Trotman, F.I.C., and R. W. Sutton. Dr. Trotman said that Rackow's results, in which sulphur dioxide was obtained by treating wool with phosphoric acid, could not be confirmed; neither could organic sulphides nor mercaptans be obtained by the action of alkalis on wool, as was stated by Chevreul. When wool was heated with hydrochloric acid to 70° C. a portion dissolved; and when the solution was neutralised to a P_n of 4 to 5, a protein containing 3.62 per cent. of sulphur was precipitated. This the authors called "protein A." The filtrate was then saturated with magnesium sulphate, when another protein containing 4.1 per cent. of sulphur was thrown down. The portion insoluble in hydrochloric acid was soluble in ammonia and was purified by reprecipitation with acid. This product was called "protein B" and was found to contain 1.49 per cent. of sulphur. When wool was treated with N/1 caustic soda a constituent was dissolved which was protein B. When cold hydrochloric acid was used instead of hot, protein B dissolved and A was insoluble. Water under two atmospheres pressure dissolved a constituent containing the same percentage of sulphur as protein B and left an undissolved residue containing 2.55 per cent. of sulphur, which might be protein A after it had undergone some decomposition. Protein A lost sulphur readily when treated with chlorine or hydrogen peroxide, but protein B was unaffected under similar conditions. It was suggested that the cortex consisted mainly of protein B and the epithelial scales consisted mainly of protein A. Results showed that the sulphur content of these proteins was constant, hence differences in the amounts of sulphur contained by different samples of wool were due rather to the variations in the relative proportions of the constituent proteins than to differences in the compositions of the proteins themselves. From their experiments it was clear that the assumption that wool protein consisted of only one protein, namely, keratin, was unwarranted. Further research was in progress.

Varying Sulphur Content

In a paper on "The Sulphur Content of Wool," by S. R. Trotman, M.A., F.I.C., and H. S. Bell, it was stated that previous investigations had shown that the sulphur content of various samples of wool varied from about 0.5 per cent. to 5 per cent. With the same sample of wool many of the methods tried by the authors did not give concordant results, the sulphur content varying from about 1.5 to 4.36 per cent. The Benedict-Denis method was selected as being most reliable, and from many samples of wool the average value obtained was 3.22 per cent. Within the limits of the experiments the authors concluded that the sulphur content of wool is constant, and that 3.4 per cent. is a probable maximum value.

Grinding Mills

INTERNATIONAL Combustion, Ltd., incorporating the Hardinge Co. for the Eastern Hemisphere, of 11, Southampton Row, London, inform us that recent orders have been received for the following Hardinge and Raymond Mills, and Hum-mer Screens:—1 4½ ft. Hardinge ball mill for grinding lead zinc ores for S/A des Mines and Fonderies Vieille Montagne, Italy. 1 7 ft. Hardinge ball mill of latest design for heavy duty for lead zinc ores in Roumania. 2 6 ft. Hardinge ball mills for tin grinding in Dutch East Indies. 1 4½ ft. Hardinge ball mill for grinding ore in Australia. 2 3 ft. Hardinge ball mills for grinding tin ores. 2 8 ft. Hardinge ball mills and 2 14 ft. Gayco air separators for grinding 20 tons per hour of coal for pulverised fuel for Belgium. 1 3-roller Raymond mill for grinding barytes for India. 1 3-roller Raymond mill for grinding oxide for Stockton-on-Tees. Complete barytes plant incorporating a 5-roller Raymond mill for the Manchester district. 2 4 ft. Hum-mer screens for screening clay for brick-making. 1 4 ft. Hum-mer screen for screening limestone for installation in England. 1 3 ft. Hum-mer screen for screening ore for installation in Germany.

Long Chain Molecules

Sir William Bragg's Address at Manchester

A JOINT meeting of the Manchester sections of the Society of Chemical Industry, the Institute of Chemistry, and the Society of Dyers and Colourists, with the Manchester Literary and Philosophical Society, was held in the Textile Institute on Friday, November 6, Mr. L. Guy Radcliffe presiding. An address, entitled "Long Chain Molecules," was given by Sir William Bragg, who said that the study of the structure of organic crystals by X-ray examination had proved extremely fascinating, because the organic molecule had many points peculiarly its own that lent special aid to X-ray investigation. It had structure, dimensions, and form, all of which properties were more or less unvaried, no matter how it linked itself with others for the purpose of forming a crystal. Chemists believed that the different parts of that structure might fulfil separate functions, and X-ray research appeared to confirm this view, which was recognised by the growing importance attached to stereotomography.

Some of the most interesting work in this direction had been carried out in connection with what were termed the "long chain molecules," which were of the first importance in the electrical industry, as well as in physiology and biology. Carbon atoms, for instance, arranged themselves either in a ring of six, called the benzene ring, or in a long chain, termed the long chain molecule. By means of X-rays such chains could be measured, and some indication of the minuteness of the molecules was given by the fact that the waves of the X-ray radiation were 10,000 times smaller than the waves of light, while the form of radiation of molecular structure disclosed by them was as many times smaller than anything which could be seen by the ordinary microscope. Therefore, when one spoke of seeing these fine things by means of X-ray radiation one was really referring to what might be termed indirect vision. Special mechanism was necessary for this purpose, of which one of the simplest types was the photographic plate. Thus it was discovered that if a speck of stearic acid was rubbed on a flat surface, such as a piece of glass or mica, the molecules arranged themselves in rows. When such arrangement took place the X-rays disclosed it, though they were not able to radiate the form of a solitary molecule. If the layers or rows were not in exact alignment with each other, there was interference of reflection with a consequential lack of their visibility upon exposure to a photographic plate, and the X-rays showed that there were many thousands of such layers or reflecting surfaces superimposed one upon the other.

New Use for the Stream-line Filter

RECENT information is to the effect that important developments and improvements have been effected in the Stream-line Filter, associated with the name of Dr. Hele-Shaw. This is borne out by a demonstration this week of the adaptability of the principle of the Stream-line Filter to the problem of preventing pollution of sea waters under the Oil in Navigable Waters Act by providing an apparatus for separating and recovering oil on oil-burning ships. The demonstration illustrated the working of a plant manufactured by the Stream-Line Filter Co. under patents held by Dr. Hele-Shaw. This apparatus consists essentially of a tubular separator and a patent filter. The separator removes the bulk of the oil, the proportion left being under 1 in 100,000. Passage through the filter removes the last traces of oil, analysis showing that less than 1 in 2,000,000 is left. The filter has a patent filter-bed, which is easily cleaned and does not need renewal when dirty. Cleaning is effected by blowing steam through the filter-bed. A low initial cost, simplicity, and cheapness of operation, and the saving of valuable oil from the bilge are the chief advantages claimed.

The Structure of Pure Iron

IN the paragraph under this title in the Metallurgical Section of last week's issue, two illustrations showing the structures of ingot iron and steel were published. These were accidentally transposed and in consequence the descriptions appearing under them were misplaced. The micrograph described as *ingot iron* should, of course, have read as *steel*, and vice versa.

From Week to Week

A FUND AMOUNTING to £2,079 has been handed over to Leeds University for the founding of an "Arthur Smithells Scholarship."

A LOAN OF \$50,000,000 for the German Potash Syndicate is expected in New York within the next few weeks in conjunction with a loan through J. Henry Schroeder and Co., London.

A BUSINESS TOUR OF THE WORLD is to be undertaken by Lieutenant-Colonel H. Lloyd Howard, director of Howards and Sons, Ltd., manufacturing chemists, of Ilford, who has left England.

THE LUDWIG MOND LECTURE will be delivered at Manchester University on December 11 by Sir W. B. Hardy, F.R.S., on the subject of "Adhesion, Friction and Chemical Constitution."

MR. FREDERICK BASCOMBE, F.I.C., director of two companies of manufacturing chemists (Fletcher, Fletcher and Co., Holloway, and Dinneford and Co., London), has been elected mayor of Lambeth.

A SERIOUS CRISIS has been reached in the Scottish shale oil industry in West Lothian, where a ballot of employees has shown a large majority against the proposed reduction in wages. Over 10,000 workers are involved.

MR. EDWARD WOOD in the course of a letter to the British Sugar Beet Society, states that next year there will probably be 18 or more sugar beet factories in this country, giving a combined output of something like 165,000 tons of sugar.

THE FOUNDING OF a chair of Applied Biology at the College of Pestology, 52, Bedford Square, London, is the proposed memorial to the late Professor H. Maxwell Lefroy, and £20,000 is needed. Donations should be sent to the College.

THE LATE LORD LEVERHULME'S mansion at Rivington Pike, Lancashire, was sold by auction in Manchester on Thursday, November 5, for £15,000 to Mr. John Magee, a member of the brewery firm of Magee, Marshall and Co., of Bolton and Burton.

TWO PAPERS were read before the Physical and Chemical Section of the Durham University Philosophical Society in Armstrong College, on Tuesday, one by Mr. R. G. Lunnon, M.Sc., on the atom, and the other by Professor H. V. A. Briscoe, on liquid action.

A TEMPORARY CHEMICAL WARFARE SCHOOL will be constructed at South Porton, Wiltshire, where the anti-gas school and chemical warfare experimental station are situated. Some of the gas instructional courses have been cancelled in view of the opening of the new school building.

AN IMPORTANT SALE of plant, machinery, etc., from the Gretna factory will take place by public auction at the Dornock Section of the factory on Thursday and Friday next, November 19 and 20, at 11 a.m. Catalogues may be obtained from Shirlaw, Allan and Co., auctioneers, Hamilton.

AN EXPLOSIVES COMBINE is announced in the agreement between Nobel Industries, Ltd., the Du Pont Company, the Dynamite Co. of Hamburg, and the Koeln-Rottweil Co. of Berlin, which provides for close technical co-operation between all the companies, especially with regard to the exchange of patents and inventions.

CHEMICAL WARFARE WAS CONDEMNED by Captain Wedgwood Benn, D.S.O., M.P., at a meeting organised by the London Council for the Prevention of War, held at the Central Hall, Westminster, on Monday. The horrors of the last war would be nothing to those of the next, he said, as attention had now centred on the chemical laboratory as the means of making war.

ON MONDAY Mr. Justice Branson, sitting in the Commercial Court, King's Bench Division, had in his list for trial the actions of the Anglo-Saxon Petroleum Co., Ltd., v. Steana Romana Soc. Anon., etc., and that of Lever Brothers, Ltd., v. Brunner, Mond and Co., Ltd. When the Court assembled, his lordship was informed that the parties had settled the actions on terms agreed.

THE CHEMISTS of the various works on the Tees are to meet to discuss the question of river pollution and preventive methods. The committee arranged last year to engage technical chemists, raise necessary funds, and deal with the whole problem is to continue to act for another year, and information is to be sought from other parts of the country where effluents from galvanising works have to be dealt with.

A VERDICT OF ACCIDENTAL DEATH was recorded at the inquest at Salford on Tuesday, on the workman who died following injuries received at the waterproofing works of Mandleberg and Co., Pendleton, when an explosion occurred on September 28. Three men died of injuries. Benzene fumes were in the room and it was supposed that they were ignited by a spark from the electric motor, but nothing was definitely proved.

THE UNANIMOUS THANKS of the Council of the Institution of Chemical Engineers has been conveyed to Bailie Thomson, convener of the Glasgow Corporation's Sewage Committee for his work in connection with the entertaining of the members of the Institution and their American visitors at Glasgow earlier in the year. The Council of the Institution has forwarded to Bailie Thomson a gold matchbox to mark their appreciation.

FIRE CAUSED CONSIDERABLE DAMAGE at the Oak Road, Clough Road, Hull, works of Alfred Smith, Ltd., chemical manufacturers, Manchester and Hull. The building involved contained several tons of sulphur, and from 50 to 60 carboys of sulphur chloride, which, together with stores of vegetable oil, were found to be burning fiercely. Although equipped with gas masks and smoke helmets, the firemen had great difficulty in withstanding the fumes.

THE DISMISSAL OF ALL EMPLOYEES of the Bereinigten Kunstseide (artificial silk) factories at Kelsterbach and the German Dunlop Company's works at Hanau affects 3,000 workers. This increases the total unemployed in the chemical and rubber industries to 26,000, and a further 2,000 will be added when a number of smaller concerns shut down on November 16. The Government Labour Minister will now have to decide whether or no to order compulsory arbitration.

DR. A. E. DUNSTAN, chief chemist to the Anglo-Persian Oil Co., speaking in London on Thursday, November 5, said that, in spite of warnings, figures showed that the visible reserves of petroleum would last for some time yet. It was well, however, to look to alternative supplies, and modification of engineering design would in future make it possible to use double the yield of motor spirit from crude oil. As to liquid fuel, there was shale oil and the great potential supply represented by coal.

A NEW ELEMENT of the atomic Number 75 is reported to have been discovered by Dr. J. Heyrowsky, Professor of Chemistry, and Dr. V. Dolejssek, Lecturer at the Czech University of Prague, and a paper on the discovery has been submitted to the Czech Academy of Science. The new element, which fills a gap in the periodic series, was, it is stated, identified in a manganese salt, and was isolated by a method devised at the University of Prague. The name "bohémium" is suggested.

NEW POISON GASES, one of which is odourless, are stated to have been invented by Professor W. L. Lewis and Dr. Stiegler, of the North Western University, U.S.A. Professor Lewis was the inventor of "Lewisite." The present experiments, which have been paid for by funds of the Public Health Institute of Chicago, have been conducted in open air laboratories, and the benches were placed under metal funnels into which the air was drawn by powerful fans to eliminate the danger of the fumes being inhaled by the workers.

THE FIRST CASE referred under the Sugar Subsidy Act was heard by Sir William Mackenzie in the Industrial Court sitting in London on Friday, November 6. The question was a difference between the English Beet Sugar Corporation, Ltd., and the National Union of General and Municipal Workers relative to the wages proposed to be paid at the Cantley factory, near Norwich, during this season's operations. This is one of the pioneer sugar beet factories, and employs during the season about 600 men. The Court reserved their decision.

IT IS REPORTED that the airship factory at Barlow is to be converted into a sugar beet factory, and that the directors of the United Sugar Corporation are interested. The Sankey Sugar Co. propose to erect a factory at Earlstown, provided that they can get suitable supplies of sugar beet. Samples of this year's crops have been analysed and have yielded up to 17.8 per cent. of sugar against a minimum of 15 per cent. The question as to whether the national price of 54s. delivered at the factory was sufficient for Lancashire remains to be ascertained.

A PROTEST AGAINST THE RECENT ACTION of the Bradford Dyers' Association in capitalising £813,886 of the reserve fund for distribution to shareholders as bonus shares in the proportion of three shares to every five shares held, being at the rate of 12s. per £1, was made at a meeting of the Joint Executive Committee of the Operative Dyers' Union, at Bradford, on Saturday, November 7. It was pointed out that the distribution was made when employees were working short time. The meeting decided to meet the employers to discuss the proposed reduction of wages of juvenile workers.

UNDER THE AUSPICES of the Chemical Engineering Group and the Yorkshire Section of the Society of Chemical Industry, the Institution of Chemical Engineers, and the Midland Institute of Mining Engineers, the discussion of the papers read in Leeds on July 16, 1925, on "Smokeless Fuel," together with the three winning papers in the recent Coke Competition, will be resumed on Friday, November 20, in the Mappin Hall of the University, Sheffield; chairman, Sir Arthur Duckham, K.C.E. There will be two sessions, morning at 10 a.m., afternoon at 2.30 p.m. All interested are invited to attend. Advance copies of all papers can be bought, and cards of admission may be obtained from the Hon. Secretary, Chemical Engineering Group, 307, Abbey House, Westminster, London, S.W.1.

Obituary

MR. JOHN JACKSON, late of Simpson and Jackson, Ltd., bleachers, Royston, aged 75 years.

MR. ROBERT LLEWELLYN TAYLOR, F.I.C., F.C.S., late organising Science Master for the Manchester Education Committee and Principal Master in the Municipal Central Secondary School, Manchester, on November 8, aged 74.

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- THIONATES.** Polythionates. Part II. The influence on thiosulphates and sulphites on the stability of polythionates. Part II. The action of hydrogen sulphide on polythionates. A. Kurtenacker and M. Kaufmann. *Z. anorg. u. allg. Chem.*, October 13, 1925, pp. 225-234 and 256-264.

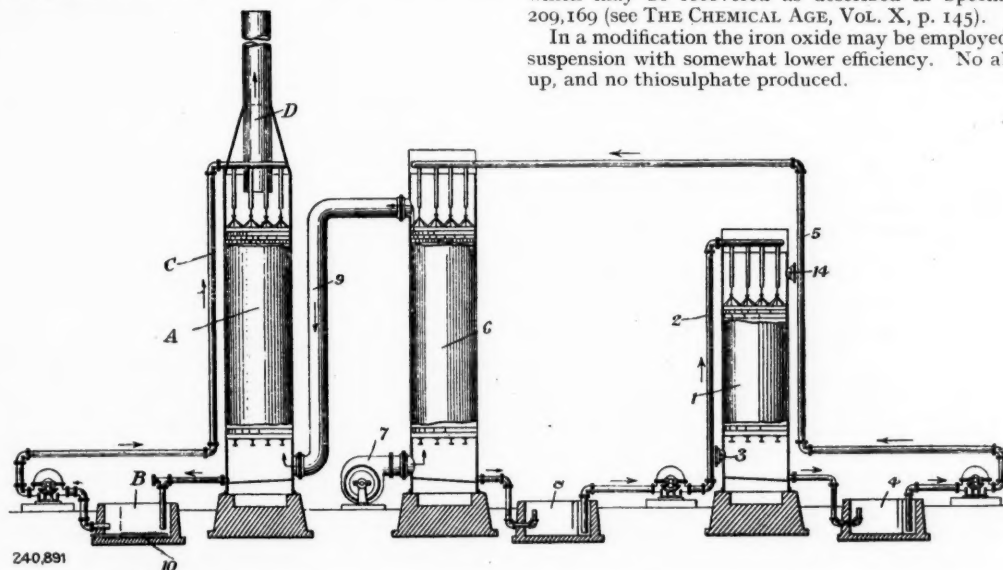
Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

240,624. CELLULOSE ACETATE, PROCESS FOR THE MANUFACTURE OF. L. A. Levy, 31, Shoot Up Hill, London. Application date, April 9, 1924.

It has been found that the acetylation of cellulose with a mixture of acetic anhydride, acetic acid, and a condensing agent such as sulphuric acid, can be considerably promoted by the addition of a metallic catalyst, so that the acetone-soluble product is obtained in a very favourable form. Cellulose, air-dried to contain 6-7 per cent. of water, is treated with acetic anhydride, acetic acid, sulphuric acid, and a metallic salt of vanadium, nickel, cobalt, or chromium. The catalyst may be added to the solution in stages—e.g., nickel acetate may be first added, and when the acetylation has reached the stage at which a transparent viscous mixture is obtained, vanadium sulphate may be added. The first stage of the acetylation can be retarded, if required, by partly neutralising the sulphuric acid. The catalyst may be added in metallic form, so that it gradually passes into solution.

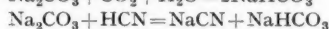
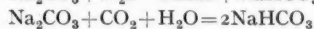
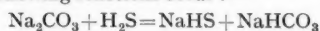


240,891. ELIMINATING HYDROGEN SULPHIDE AND OTHER IMPURITIES FROM FUEL GASES AND AIR, PROCESS AND APPARATUS FOR. W. J. Mellersh-Jackson, London. From The Koppers Co., 800, Union Trust Building, Pittsburgh, Pa., U.S.A. Application date, June 5, 1924.

Specifications Nos. 169,996 and 170,572 (see THE CHEMICAL AGE, Vol. V, pp. 710 and 774) described a process for removing hydrogen sulphide, etc., from coal gas and water gas by treating the gas with sodium carbonate solution which absorbs the hydrogen sulphide, and then regenerating the washing liquid by aeration, which transfers the impurities to the air. In this invention, the air is washed with a liquid containing an iron compound which decomposes the hydrogen sulphide, and this washing liquid then regenerated by means of air. Sulphur is thus recovered, and the stream of air can be discharged into the atmosphere without contaminating it.

The gas enters the absorber 1 at 3 and is treated with sodium carbonate solution supplied through the pipe 2 at the top. Purified gas passes out at 14, and the solution containing the impurities collects in a tank 4. This solution is pumped through a pipe 5 to the top of the chamber 6, in which it is treated with air supplied by a blower 7 at the bottom. The regenerated solution passes into a tank 8, and is then returned to the chamber 1. The air, which may contain hydrogen

sulphide, hydrogen cyanide, and carbon dioxide, passes through a pipe 9 to the bottom of the chamber A, and a suspension of iron oxide in alkaline solution is pumped from a tank B through a pipe C to the top of the tower A, in which it absorbs the hydrogen sulphide. A 0.5 per cent. - 1 per cent. solution of sodium carbonate containing a 2-3 per cent. suspension of iron oxide may be employed. An oxidation of the absorbed sulphide to free sulphur takes place simultaneously with the absorption, and the process is a continuous one. In the chamber 1 the following reactions occur:—



The iron oxide is converted into iron sulphide which by the action of air is reconverted to iron oxide with liberation of sulphur, which is periodically recovered. In addition to these reactions, some of the sodium hydrogen sulphide may react with air and free sulphur to produce sodium thiosulphate, which may be recovered as described in Specification No. 209,169 (see THE CHEMICAL AGE, Vol. X, p. 145).

In a modification the iron oxide may be employed in a water suspension with somewhat lower efficiency. No alkali is used up, and no thiosulphate produced.

240,955. METHANOL AND HIGHER ALCOHOLS, SYNTHETIC MANUFACTURE OF. J. Y. Johnson, London. From Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, July 29, 1924.

It has been found that methanol, either pure or mixed with other oxygen compounds mainly higher alcohols, can be obtained by the reaction of carbon monoxide and hydrogen in the presence of a catalyst at a high temperature and pressure, provided the gases do not come into contact with iron, and do not contain any iron in suspension or in the form of volatile iron compounds such as iron carbonyl. The catalyst may be a metal or metal oxide or their mixtures, excluding nickel and cobalt which lead to the production of methane. The pressure may be above 50 atmospheres and temperature between 250° C. and 600° C.

A copper-lined tube contains a granular mixture of equimolecular proportions of chromium oxide and manganese oxide. A gaseous mixture of hydrogen 80 per cent. and carbon monoxide 20 per cent. by volume is freed from iron compounds and passed through the tube at a pressure of 220 atmospheres, and temperature of 450° C. Methanol is obtained by cooling the issuing gas under pressure. Another example is given in which a mixture of carbon monoxide, nitrogen, and hydrogen is passed over a mixture of chromium oxide and zinc oxide,

yielding nearly pure methanol. In other cases in which the catalyst contains a small proportion of potassium carbonate and the gas contains a higher proportion of carbon monoxide, and is passed through at a higher velocity, the products may include propyl, butyl and amyl alcohols in addition to methanol.

240,968. 4-AMINO-3-OXYBENZENE-1-ARSINIC ACID, MANUFACTURE OF. A. J. Ransford and A. Carpmal, London. From L. Cassella and Co., G.m.b.H., Frankfurt-on-Main, Germany. Application date, August 6, 1924.

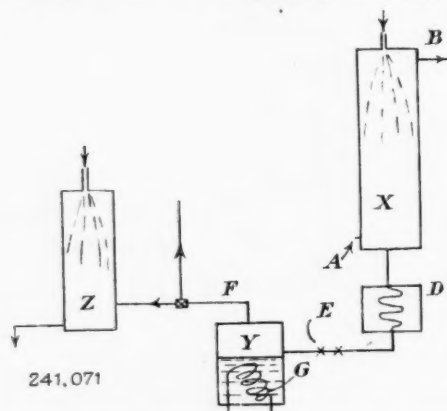
This compound, which has been obtained only with difficulty, is now produced by heating benzoxazolone-4-arsinic acid, described in Specification No. 240,969 below, with alkalis. The splitting of the benzoxazolone ring is effected without an alteration in the remaining arsinic acid. The homologues and substitution products, *e.g.*, the 5-methyl-benzoxazolone-4-arsinic acid, and the 5-chloro-benzoxazolone-4-arsinic acid may be similarly converted into the corresponding aminooxy-arsinic acids. Examples are given.

240,969. ARSINIC ACIDS OF THE AROMATIC SERIES, MANUFACTURE OF. A. J. Ransford and A. Carpmal, London. From L. Cassella and Co., G.m.b.H., Frankfurt-on-Main, Germany. Application date, August 6, 1924.

The 2:1-benzoxazolone-4-arsinic acid is obtained by reducing the 4-nitro-benzoxazolone to the amino compound, and converting the latter to the arsinic acid by diazotising and treating with sodium arsinite. The substituted benzoxazolones may be similarly treated. This process has the advantage over that described in Specification No. 214,628 (see THE CHEMICAL AGE, Vol. X, p. 681) in that it is not necessary to start from the 4-amino-3-oxybenzene-1-arsinic acid, but from the easily obtainable benzoxazolone.

241,071. OBTAINING AMMONIA FROM SYNTHESIS GASES. Synthetic Ammonia and Nitrates, Ltd., R. E. Slade and K. Gordon, Billingham, Stockton-on-Tees, Durham. Application date, January 30, 1925.

In the separation of ammonia from the synthesis gases as anhydrous liquid ammonia, costly refrigerating apparatus is

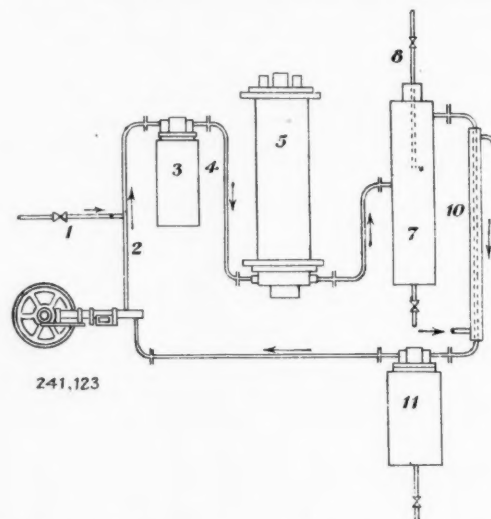


involved, and in the separation as an aqueous solution it is necessary to inject into the system quantities of high pressure water, yielding a solution containing 35 per cent. ammonia at ordinary temperature and pressure. In this invention, the advantages of these two methods are combined, together with economies in the cost of operation. The gases containing ammonia are treated with a stream of high pressure water which is limited so as to produce a solution containing 50-70 per cent. of ammonia. The liquor is collected under high pressure, and passed through reducing valves to atmospheric pressure. Ammonia is thus evolved in the form of 100 per cent. gas, leaving a solution of 35 per cent. strength. The ammonia gas may be employed for mixing with air prior to oxidation in the production of nitric acid, or the ammonia may be absorbed in water at atmospheric pressure. Alternatively, the high pressure ammonia solution may be diluted by running into water at atmospheric pressure. It is found that although a solution of 50 per cent. strength is made in the absorption tower, only about 0.3 per cent. of ammonia remains in the gas mixture.

The ammoniacal gases are passed into the bottom of an absorption tower X, while high pressure water is injected at the top. The nitrogen-hydrogen mixture escapes at B, and the liquor, which is warm due to heat of solution, may be passed through a cooling coil D if required as solution only. The liquor passes through reducing valves E to a vessel Y, and the liberated ammonia passes through pipe F, either for use as gas or for further absorption in a tower X at atmospheric pressure. If more gas is required, a steam-heated coil G may be placed in the tank Y. The nitrogen-hydrogen mixture is treated for the removal of water vapour by refrigeration as described in Specification No. 240,350 (see THE CHEMICAL AGE, Vol. XIII, p. 453).

241,123. UREA, PROCESS FOR THE PRODUCTION OF. L. Casale, 9, Via del Parlamento, Rome. International Convention date, December 23, 1924.

In this process the expense of supplying the necessary heat for the production of urea from carbon dioxide and



ammonia is avoided by combining the manufacture of urea with the synthetic production of ammonia. In synthetic apparatus such as described in Specifications Nos. 185,179 and 193,789 (see THE CHEMICAL AGE, Vol. VII, p. 502, and Vol. VIII, p. 350) the gaseous mixture containing ammonia is at a temperature of about 250° C. and pressure of about 800 atmospheres. If compressed carbon dioxide is now introduced at such a temperature that the temperature in the reaction chamber is between 150° and 200° C. and in a quantity smaller than that corresponding to the ammonia present, then urea is rapidly produced.

The mixture of nitrogen and hydrogen with or without ammonia passes from the tube 1 to the tube 2 where it meets a mixture of nitrogen and hydrogen circulated by a pump 12. The mixture passes through a purifier 3 and tube 4 to a catalytic apparatus 5 and the products pass into a chamber 7 which may contain a catalytic agent such as alumina, kaolin, or silica. Carbon dioxide is injected through the tube 8 and the resulting urea condenses in the lower part of the tube 7 which may be cooled. Gases pass through a cooler 10 and water, ammonium carbonate, and ammonia are collected in the receiver 11. The remaining nitrogen-hydrogen mixture passes back into circulation.

241,135. CATALYTIC OXIDATION OF AMMONIA. J. Y. Johnson, London. From Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, June 19, 1925.

In the catalytic oxidation of ammonia by means of air the nitrogen oxides obtained are dilute, and if oxygen is used instead of air there is a risk of explosion. It has been found that oxygen or gases rich in oxygen may be safely employed if the ammonia is added by degrees in small amounts. The catalytic treatment after each addition may be effected with a separate catalytic mass or with the same catalyst in a circulating system. The heat generated may be utilised for

the production of steam. The nitrogen oxide already formed does not interfere with the freshly added ammonia and a gas containing more than 50 per cent. of nitrogen oxide can be obtained. This will yield an acid of more than 55 per cent. strength, or the nitrogen oxides may be separated by liquefaction. The process may be effected by adding small quantities of ammonia and then subjecting to catalysis, or by passing the reaction gases over the catalyst while continuously introducing ammonia and oxygen before catalysis and continuously withdrawing a corresponding amount of gas rich in nitrogen oxides after catalysis.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention:—220,953 (G. Austerweil), relating to preparation of thymol from *p*-cymene, see Vol. XI, p. 450; 225,199 (C. Asseev), relating to production of chemically pure aluminium compounds, see Vol. XII, p. 87; 225,216 (Barrett Co.), relating to polymerisation of resin forming constituents of naphthas, see Vol. XII, p. 116; 225,544 (Soc. of Chemical Industry in Basle), relating to manufacture of indigoid dyestuffs of the anthraquinone series and intermediate products, see Vol. XII, p. 116; 231,501 (A. Danilowitsch and G. Petroff), relating to clear and transparent infusible condensation products from phenol and formaldehyde, see Vol. XII, p. 590; 232,958 (Akt.-Ges. für Anilin Fabrikation), relating to colourless compounds containing sulphur suitable for adsorption on textile fibres, etc., see Vol. XIII, p. 18; 238,520 (Soc. Chimique des Usines du Rhône), relating to manufacture of aldehyde, see Vol. XIII, p. 402.

International Specifications not yet Accepted

239,849. INDIARUBBER. Naugatuck Chemical Co., Elm Street, Naugatuck, Conn., U.S.A. (Assignees of O. H. Smith, 561, West 58th Street, New York.) International Convention date, September 15, 1924.

Rubber latex is preserved, and subsequent vulcanisation accelerated by adding normal alkaline-base salts of phosphorus acids. A phosphate having a hydrogen ion concentration in 2 per cent. solution of less than 10^{-6} accelerates vulcanisation, but the concentration must be less than 10^{-8} to preserve latex. Tripotassium phosphate, trisodium phosphate, potassium and sodium pyrophosphates, secondary sodium phosphite, sodium ammonium hydrogen phosphate, secondary ammonium and sodium phosphates are suitable.

LATEST NOTIFICATIONS

- 242,223. Process for the continuous distillation of hydrocarbons with simultaneous cracking of high-boiling into low-boiling hydrocarbons. Wolf, H. November 3, 1924.
- 242,230. Centrifugal pumps. Schmidt, J. J., and Brice, A. L. October 31, 1924.
- 242,233. Dyeing-process. Badische Anilin- and Soda-Fabrik. October 30, 1924.
- 242,234. Manufacture of silica gel. Chemische Fabrik auf Actien (vorm. E. Schering). November 3, 1924.
- 242,274. Colouring of plastic materials. Badische Anilin- and Soda-Fabrik. November 3, 1924.
- 242,296. Manufacture of a new pharmaceutical compound. Farbenfabriken vorm. F. Bayer and Co. October 29, 1924.
- 242,306. Process for manufacturing dyestuffs. Zinke, Dr. A. November 3, 1924.

Specifications Accepted with Date of Application

- 219,971. Soluble carbonates or hydroxides from insoluble carbonates, oxides, or hydroxides, Process of producing. A. F. Meyerhofer. August 2, 1923.
- 219,983. Hafnium and zirconium, Process for separating. Naamloze Vennootschap Philips' Gloeilampenfabrieken. July 30, 1923.
- 220,303. New dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. August 11, 1923.
- 220,649. Catalytic production of hydrogen. Synthetic Ammonia and Nitrates, Ltd. August 16, 1923.
- 230,457. -amino-alkyl substituted aminonaphthalene sulphonic acids, Manufacture of. Farbenfabriken vorm. F. Bayer and Co. March 4, 1924.
- 226,490. Salts of complex hydrofluoric acids, Process of producing. A. F. Meyerhofer. December 20, 1923.
- 231,512. Diethylbarbituric acid and 4-dimethylamino-2-3-dimethyl-1-phenyl-5-pyrazolone, Manufacture of a new compound from. P. Pfeiffer. March 27, 1924.

- 231,840. Oil-cracking stills. Sinclair Refining Co. April 1, 1924.
- 234,518. Titanic acid, Manufacture of. Deutsche Gasglühlicht-Auer-Ges. May 24, 1924.
- 237,591. Cellulose acetate, Manufacture of. Ketoid Co. July 22, 1924.
- 241,669. Recovering cyanogen from solutions. L. D. Mills and T. B. Crowe. September 3, 1924.
- 241,679. Cellulose compounds, Production of. Courtaulds, Ltd. W. H. Glover, and E. van Weyenbergh. September 15, 1924.
- 241,682. Removing phenol and/or its homologues from liquids such as waste waters or the like, Method of. P. Preiss. September 19, 1924.
- 241,687. Alloys. E. C. R. Marks. (E.I. Du Pont de Nemours and Co.) September 24, 1924.
- 241,149. Cellulose compounds, Manufacture of. L. Lilienfeld. October 11, 1923.
- 241,752. Separation of vapours by absorption, Process for. P. C. Lemale. December 19, 1924.
- 241,767. Alkamine esters of N-substituted para-aminobenzoic acid, Manufacture of. O. Y. Imray. (Farbwerke vorm. Meister, Lucius, and Brüning.) January 15, 1925.
- 241,771. Catalytic synthesis of ammonia. S. G. S. Dicker. (H. Harter and A. T. Otto.) January 21, 1925.
- 241,795. Lithopone, Manufacture of. W. Carpmael. (Farbenfabriken vorm. F. Bayer and Co.) March 27, 1925.
- 241,817. Catalytic apparatus for the synthesis of ammonia. Synthetic Ammonia and Nitrates, Ltd., and F. H. Bramwell. May 4, 1925.
- 241,838. Rubber and similar materials, Process for the vulcanisation of. Dovan Chemical Corporation. February 7, 1925.
- 241,844. Zirconium alloys, especially alloys containing silicon and zirconium of reduced silicon content, Process of preparing. H. E. Potts. (Electro-Metallurgical Co.) July 7, 1925.
- 240,420. Sulpho-cyano derivatives. Akt.-Ges. für Anilin Fabrikation. September 24, 1924.

Applications for Patents

- Akt.-Ges. für Anilin- Fabrikation. Manufacture of colourless compounds containing sulphur for adsorption on textile fibres, etc. 27,768. November 4. (Germany, November 14, 1924.)
- Algemeene Norit Maatschappij. Manufacture of active carbon. 27,960. November 6. (Germany, November 8, 1924.)
- Badische Anilin- and Soda-Fabrik and Johnson, J. Y. Manufacture of solid calcium nitrate. 27,486. November 2.
- Badische Anilin- and Soda-Fabrik and Johnson, J. Y. Feeding solids into vessels, etc. 27,851. November 5.
- Badische Anilin- and Soda-Fabrik and Johnson, J. Y. Treatment of tar water. 27,852. November 5.
- Badische Anilin- and Soda-Fabrik and Johnson, J. Y. Manufacture of urea. 27,853. November 5.
- Badische Anilin- and Soda-Fabrik and Johnson, J. Y. Manufacture of yellow dyestuffs. 27,854. November 5.
- British Cyanides Co., Ltd. Manufacture of artificial resins. 27,884. November 5.
- Caird, M. N., Coombs, E., and Grimble, F. Centrifugal separators for liquids. 28,056. November 7.
- Caird, M. N., Coombs, E., and Grimble, F. Trap for outlets of centrifugal separating machines. 28,057. November 7.
- Caird, M. N., Coombs, E., and Grimble, F. Centrifugal mixing or emulsifying apparatus. 28,058. November 7.
- Coulier, S. Manufacture of alkaline cyanides. 28,054. November 7.
- Dreyfus, H. Manufacture of aliphatic compounds. 28,044. November 7.
- Farbwerke vorm. Meister, Lucius, and Brüning. Process for separating solid salts of ammonium and of the alkalies or alkaline earths. 27,769. November 4. (Germany, November 17, 1924.)
- Field, C. H., and Owen, G. Oxidation of organic compounds. 28,031. November 7.
- Grasselli Chemical Co., and Marks, E. C. R. Electrolytic deposition of cadmium. 27,765. November 4.
- Kyber, W. Manufacture of phosphoric acid. 27,760. November 4. (Germany, November 7, 1924.)
- MacKay, H. S. Electrochemical extraction of copper and zinc from ores. 27,731. November 4.
- Parkinson, T. Dyeing-machine. 27,803. November 5.
- Ravinetti, G. Purification of fats. 27,512. November 2.
- Rossiter, E. C. Manufacture of artificial resins. 27,884. November 5.
- Saechting, W. Process for bleaching and refining curd soap. 28,017. November 7. (Germany, November 24, 1924.)
- Varcoe, R. G. Treatment of china clay. 27,916. November 6.
- Woodhouse, B. M. Centrifugal pumps. 27,971. November 6.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, November 13, 1925.

THERE has been a very great improvement in the commercial outlook during the past week and business is picking up steadily.

Prices generally are on the up grade.

There is a little more export inquiry about, but not much actual business is passing.

General Chemicals

ACETONE is very firm and scarce, being quoted at £79 to £81 per ton.

ACID ACETIC is in steady demand at recent prices.

ACID FORMIC is advanced in price and is quoted £49 to £51 per ton for 85%.

ACID LACTIC is quiet market, price nominally £43 to £44 per ton for 50% by weight.

ACID OXALIC.—The higher prices have been maintained, quotations now being 3½d. per lb.

ALUMINA SULPHATE.—A steady business is passing at about £5 10s. per ton for 17-18%.

AMMONIUM CHLORIDE is slow and uninteresting.

ARSENIC.—The market is absolutely dead. There is an entire absence of demand, but any improvement in consumption would be reflected at once upon the price.

BARIUM CHLORIDE is very firm and is quoted £8 15s. to £9 per ton.

BLEACHING POWDER.—Unchanged.

EPSOM SALTS.—Firm at £5 10s. to £5 15s. per ton.

FORMALDEHYDE is very scarce, spot supplies commanding £42 to £44 per ton.

LEAD ACETATE is a fairly active market, quoted at £45 to £46 per ton for White and £43 to £44 per ton for Brown.

LIME ACETATE is much firmer at about £17 10s. per ton.

LITHOPONE.—Unchanged, but inclined to be firmer.

POTASSIUM CARBONATE is a slack market at £23 10s. per ton for 90/92%.

POTASSIUM CAUSTIC.—Unchanged.

POTASSIUM CHLORATE.—Rather larger supplies are in sight.

To-day's price is 4d. to 4½d. per lb.

POTASSIUM PERMANGANATE is in good demand at 7½d. per lb.

SODIUM ACETATE is quiet and uninteresting at £17 10s. per ton.

SODIUM BICHROMATE is in good demand. A considerable business is passing at English maker's quotations.

SODIUM HYPOSULPHITE is unchanged.

SODIUM NITRITE is in better demand and quoted at £22 10s. per ton.

SODIUM PRUSSATE is firm at 4½d. to 4¾d. per lb.

SODIUM SULPHIDE is weak.

ZINC SULPHATE.—Unchanged.

Coal Tar Products

The tone of the market for Coal Tar Products is firm, and there is little change to report from last week.

90% BENZOL is firm at 1s. 8d. per gallon on rails.

PURE BENZOL remains unchanged at 1s. 11d. to 2s. per gallon, on rails.

CREOSOTE OIL is firm, at 6½d. per gallon on rails in the North, while the price in London is about 7½d. per gallon.

CRESYLIC ACID is steady, the Pale quality 97/99% being quoted at about 1s. 7d. to 1s. 8d. per gallon, on rails, while the Dark quality 95/97% is worth about 1s. 3d. to 1s. 4d. per gallon.

SOLVENT NAPHTHA is unchanged, at 1s. 4d. per gallon on rails. HEAVY NAPHTHA is quoted at 1s. 1d. per gallon.

NAPHTHALENES remain firm, the lower grades being worth from £4 to £4 10s. per ton, 76/78 quality about £6 per ton, and 74/76 quality about £5 10s. per ton.

PITCH is unchanged at 42s. 6d. f.o.b. U.K. ports.

Latest Oil Prices

LONDON.—LINSEED OIL closed steady at 5s. advance. Spot, £38 5s.; November and December, £37; January-April, £36 17s. 6d.; May-August, £36 2s. 6d. RAPE OIL quiet. Crude crushed, spot, £47 10s.; technical refined, £50 10s. COTTON OIL steady. Refined common edible, £45; Egyptian crude, £39; deodorised, £47. TURPENTINE quiet at 1s. to 9d. per cwt. lower. American spot, 76s. 9d.; November, 77s.; and January-April, 78s. 9d.

HULL.—LINSEED OIL.—Spot, £37 15s.; November-December, £37 5s.; January-April, £36 17s. 6d.; May-June, £36 2s. 6d. COTTON OIL.—Bombay crude, £36; Egyptian crude, £37 5s.; edible refined, £40 5s.; technical, £39. PALM KERNEL OIL.—Crushed, naked, 5½ per cent., £42 10s. GROUND-NUT OIL.—Crushed/extracted, £46; deodorised, £50. SOYA OIL.—Extracted and crushed, £40; deodorised, £43 10s. RAPE OIL.—Extracted and crushed, £46 per ton, net cash terms, ex mill. CASTOR OIL and COD OIL unaltered.

Nitrogen Products Market

Export.—During the last week the demand for sulphate of ammonia has continued and the market remains firm at £12 5s. per ton f.o.b. in single bags. It seems certain that the producers will be able to carry out their policy of raising prices as the season advances.

Home.—The home demand is quiet with sales for November smaller than for last November. This is no doubt due to heavier summer deliveries. Announcements of higher prices for December up to May are expected shortly.

Nitrate of Soda.—The nitrate market continues quiet, cargoes c.i.f. chief European ports are changing hands at £11 8s., £11 10s., per ton for prompt arrival, with slightly higher prices for later arrivals.

American Market Movements

(From Drug and Chemical Markets.)

CONTRACT closings for 1926 occupy the time of heavy chemical makers. Spot situation steady. Prussiates firm. Ammonium chloride easy. Barium chloride firm. Copperas firmer with contract prices announced. Pyridine firm but quiet. Benzene in heavy demand. Phenol barely steady. Toluene strong due to scarcity of supplies. Cresylic acid weak. Intermediates show no variation either in quotation or demand.

Fine chemicals are now moving well into consuming circles with prices firmer, but changes few. Glycerin higher, guaiacol crystals lower, quicksilver firm, zinc stearate stronger.

Linseed oil down. Cottonseed oil lower. Chinawood oil easier. Coconut oil situation unchanged. Animal oils and fats fairly steady, although shading is in order on some products. Fish oils quiet but firm.

U.S. Chemical Manufacturers and German Fusions

THE Grasselli Dyestuff Corporation, New York, has been expelled from membership in the Synthetic Organic Chemical Manufacturers' Association as a result of the recent consolidation of its sales organisations with the General Dyestuff Corp., New York, the successor to Herman A. Metz and Co. As the Metz organisation is expected to become the future exclusive sales agent in the United States for the newly organised German dyestuff Cartel, this step is thought to be a declaration of war by American dyestuff manufacturers against what they believe is an attempt on the part of the Cartel through the General Dyestuff Corp. to dominate the American market. One of the leading firms of the Cartel, the Badische Anilin- und Sodafabrik, is now represented in New York by Kuttroff, Pickhardt & Co. There have been reports that this firm would also join the General Dyestuffs Corp. and thus unify Cartel sales efforts in the United States.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

Acid Acetic, 40% Tech.—£20 per ton.
 Acid Boric, Commercial.—Crystal, £40 per ton, Powder, £42 per ton.
 Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.
 Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
 Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
 Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
 Bleaching Powder.—Spot, £10 10s. d/d; Contract, £8 10s. d/d, 4 ton lots.
 Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.
 Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
 Calcium Chlorate (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
 Copper Sulphate.—£25 to £25 10s. per ton.
 Methylated Spirit 64 O.P.—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
 Nickel Sulphate.—£38 per ton d/d.
 Nickel Ammonia Sulphate.—£38 per ton d/d.
 Potash Caustic.—£30 to £33 per ton.
 Potassium Bichromate.—5d. per lb.
 Potassium Chlorate.—3½d. per lb., ex wharf, London, in cwt. kegs.
 Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.
 Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.
 Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength; 30s. less for contracts.
 Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.
 Sodium Acetate 97/98%.—£21 per ton.
 Sodium Bicarbonate.—£10 10s. per ton, carr. paid.
 Sodium Bichromate.—4d. per lb.
 Sodium Bisulphite Powder 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.
 Sodium Chlorate.—3d. per lb.
 Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool.
 Sodium Nitrite 100% basis.—£27 per ton d/d.
 Sodium Phosphate, £14 per ton, f.o.r. London, casks free.
 Sodium Sulphate (Glauber Salts).—£3 12s. 6d. per ton.
 Sodium Sulphide conc. solid. 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. pd.
 Sodium Sulphide Crystals.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. pd.
 Sodium Sulphite, Pea Crystals.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—4½d. to 4½d. per lb. Crude 60's, 1s. 3d. to 1s. 4d. Very poor demand.
 Acid Cresylic 97/99.—1s. 7d. to 1s. 7½d. per gall. Pale, 95%, 1s. 7d. to 1s. 7½d. per gall. Dark, 1s. 6d. per gall. Good demand.
 Anthracene Paste 40%.—3d. per unit per cwt.—Nominal price. No business.
 Anthracene Oil, Strained.—10d. per gall. Good inquiry. Unstrained, 7d. to 7½d. per gall.
 Benzol.—Crude 65's.—11d. to 1s. 3d. per gall., ex works in tank wagons. Standard Motor, 1s. 8d. to 1s. 10d. per gall., ex works in tank wagons. Pure, 2s. 0½d. to 2s. 3d. per gall., ex works in tank wagons. Firm.
 Toluol.—90%.—1s. 9d. per gall. More inquiry. Pure, 1s. 11d. to 2s. 2d. per gall.
 Xylol Commercial.—1s. 11d. to 2s. 3d. per gall. Pure, 2s. 3d. to 3s. 3d. per gall.
 Creosote.—Cresylic, 20/24%, 8½d. per gall. Market very quiet. Standard specification, 7d. per gall.; middle oil, heavy, 6½d. per gall. Market steady.
 Naphtha.—Crude 9½d. per gall. Solvent 90/160, 1s. 6½d. per gall. Fair business. Solvent 90/190, 1s. 0½d. per gall. Moderate demand.
 Naphthalene Crude.—Drained Creosote Salts, £5 per ton. Whizzed or hot pressed, £4 10s. to £5. Better inquiry.
 Naphthalene.—Crystals and Flaked, £12 to £13 per ton, according to districts.
 Pitch.—Medium soft, 36s. to 42s. 6d. per ton, according to district. Moderate demand.
 Pyridine.—90/160, 18s. 6d. to 19s. per gall. Fair demand. Heavy, 9s. 6d. to 10s. per gall. More inquiry.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
 Acid Amidonaphthol disulpho (1-8-2-4).—10s. 9d. per lb.
 Acid Anthranilic.—7s. per lb. 100%.
 Acid Benzoic.—1s. 9d. per lb.
 Acid Gamma.—9s. per lb.
 Acid H.—3s. 6d. per lb. 100% basis d/d.
 Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.
 Acid Neville and Winther.—4s. 9d. per lb. 100% basis d/d.
 Acid Sulphanilic.—9d. per lb. 100% basis d/d.
 Aluminium Chloride, anhydrous.—10d. per lb. d/d.
 Aniline Oil.—7d. to 7½d. per lb. naked at works.
 Aniline Salts.—7d. to 8d. per lb. naked at works.
 Antimony Pentachloride.—1s. per lb. d/d.
 Benzaldehyde.—2s. 1½d. per lb. Good home inquiry.
 Benzidine Base.—3s. 6d. per lb. 100% basis d/d.
 Benzyl Chloride 95%.—1s. 1d. per lb.
 p-Chlorophenol.—4s. 3d. per lb. d/d.
 p-Chloraniline.—3s. per lb. 100% basis.
 o-Cresol 29/31° C.—3d. per lb. Demand quiet.
 m-Cresol 98/100%.—2s. 1d. per lb. Demand moderate.
 p-Cresol 32/34° C.—2s. 1d. per lb. Demand moderate.
 Dichloraniline.—2s. 3d. per lb.
 Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.
 Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.
 Dimethylaniline.—2s. per lb. d/d. Drums extra.
 Dinitrobenzene.—9d. per lb. naked at works.
 Dinitrochlorobenzene.—£84 10s. per ton d/d.
 Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 10d. per lb. naked at works.
 Diphenylaniline.—2s. 10d. per lb. d/d.
 G. Salt.—2s. 2d. per lb. 100% basis d/d.
 a-Naphthol.—1s. 10d. per lb. d/d. Fair home inquiry.
 B-Naphthol.—11d. to 1s. per lb. d/d. Fair home inquiry.
 a-Naphthylamine.—1s. 2d. to 1s. 3d. per lb. d/d. Fair home inquiry.
 B-Naphthylamine.—3s. 9d. per lb. d/d. Fair home inquiry.
 o-Nitraniline.—5s. 9d. per lb.
 m-Nitraniline.—3s. 6d. per lb. d/d.
 p-Nitraniline.—1s. 11d. per lb. d/d. Fair home inquiry.
 Nitrobenzene.—5d. to 5½d. per lb. naked at works. Good home inquiry.
 o-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.
 Nitronaphthalene.—10d. per lb. d/d.
 p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
 p-Nitro-o-amido-phenol.—4s. 6d. per lb. 100% basis.
 m-Phenylene Diamine.—4s. per lb. d/d.
 p-Phenylene Diamine.—9s. 9d. per lb. 100% basis d/d.
 R. Salt.—2s. 4d. per lb. 100% basis d/d.
 Sodium Naphthionate.—1s. 7½d. to 1s. 8d. per lb. 100% basis d/d.
 o-Toluidine.—9d. per lb. Good home inquiry.
 p-Toluidine.—2s. 3d. per lb. naked at works.
 m-Tolylene Diamine.—4s. per lb. d/d.
 m-Xylidine acetate, 2s. 11d. per lb. 100%.

Wood Distillation Products

Acetate of Lime.—Brown £8. Quiet market. Grey, £14 10s. per ton. Liquor, 9d. per gall. 32° Tw.
 Acetone.—£73 per ton.
 Charcoal.—£7 to £9 per ton, according to grade and locality. Demand fair.
 Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.
 Red Liquor.—10d. to 1s. per gall. 15° Tw.
 Wood Creosote.—2s. 7d. per gall. Unrefined.
 Wood Naphtha, Miscible.—5s. per gall.
 60° O.P. Solvent, 4s. 6d. per gall. 40° O.P. Very quiet.
 Wood Tar.—£3 15s. to £5 per ton, according to grade.
 Brown Sugar of Lead.—£40 per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 7½d. to 1s. 5d. per lb., according to quality. Crimson, 1s. 5d. to 1s. 7½d. per lb., according to quality.
 Arsenic Sulphide, Yellow.—2s. per lb.
 Barytes.—£3 10s. to £6 15s. per ton, according to quality.
 Cadmium Sulphide.—4s. 4d. per lb.
 Carbon Bisulphide.—£25 to £28 per ton, according to quantity.
 Carbon Black.—5½d. per lb., ex wharf.
 Carbon Tetrachloride.—£55 to £60 per ton, according to quantity, drums extra.
 Chromium Oxide, Green.—1s. 3d. per lb.
 Diphenylguanidine, 4s. to 4s. 3d. per lb.
 Indiarubber Substitutes, White and Dark.—5½d. to 6½d. per lb.
 Lamp Black.—£43 per ton, barrels free.
 Lead Hyposulphite.—9d. per lb.
 Lithopone, 30%.—£22 10s. per ton.
 Mineral Rubber "Rubpron".—£13 12s. 6d. per ton f.o.r. London.
 Sulphur.—£9 to £11 per ton, according to quality.

Sulphur Chloride.—4d. per lb., carboys extra.
Sulphur Precip. B.P.—£50 to £55 per ton.
Thiocarbamide.—2s. 6d. to 2s. 9d. per lb.
Thiocarbamide.—2s. 1d. to 2s. 3d. per lb.
Vermilion, Pale or Deep.—5s. per lb.
Zinc Sulphide.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

Acid, Acetic, 80 % B.P.—£39 per ton ex wharf London in glass containers.
Acid, Acetyl Salicylic.—2s. 6d. to 2s. 8d. per lb. Keen competition continuing. Good demand.
Acid, Benzoic B.P.—2s. to 2s. 3d. per lb., according to quantity.
Acid, Boric B.P.—Crystal £46 per ton, Powder £50 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 4d. per lb., less 5%. Unsettled.
Acid, Gallic.—2s. 9d. per lb. for pure crystal, in cwt. lots.
Acid, Pyrogalllic, Crystals.—5s. 6d. per lb. Resublimed 9s. per lb.
Acid, Salicylic.—1s. 4d. to 1s. 6d. per lb. Technical.—10½d. to 11d. per lb.
Acid, Tannic B.P.—2s. 10d. per lb.
Acid, Tartaric.—1s. 0½d. per lb., less 5%. Market firm.
Amidol.—6s. 6d. per lb., d/d.
Acetanilide.—1s. 5d. per lb. for quantities.
Amidopyrin.—12s. 6d. per lb.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb., according to quantity.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
Atropine Sulphate.—11s. per oz. for English make.
Barbitone.—10s. 3d. per lb.
Benzonaphthol.—3s. 3d. per lb. spot.
Bismuth Carbonate.—12s. 9d. to 14s. 9d. per lb.
Bismuth Citrate.—11s. 4d. to 13s. 4d. per lb.
Bismuth Salicylate.—10s. 2d. to 12s. 2d. per lb.
Bismuth Subnitrate.—10s. 9d. to 12s. 9d. per lb. according to quantity.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 1s. 10d. to 2s. per lb.; sodium, 2s. 1d. to 2s. 3d. per lb.; ammonium, 2s. 5d. to 2s. 7d. per lb., all spot. British or Imported. Firm.
Calcium Lactate.—1s. 3½d. to 1s. 6½d. B.P. 1s. 8d. to 2s., according to quantity.
Chloral Hydrate.—3s. 5d. to 3s. 6d. per lb., duty paid.
Chloroform.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
Creosote Carbonate.—6s. per lb.
Formaldehyde.—£40 per ton, in barrels ex wharf.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 60%, 2s. 6d. per lb.
Guaiacol Carbonate.—6s. to 6s. 6d. per lb.
Hexamine.—2s. 4d. to 2s. 6d. per lb.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydrogen Peroxide (12 vols.).—1s. 8d. per gallon f.o.r. makers' works, naked.
Hydroquinone.—4s. 4½d. per lb., in cwt. lots.
Hypophosphites.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—1s. 10d. to 2s. 1d. per lb. Green, 2s. 2d. to 2s. 7d. per lb. U.S.P., 1s. 9d. to 2s. per lb. Prices advanced.
Magnesium Carbonate.—Light Commercial, £33 per ton net.
Magnesium Oxide.—Light Commercial, £70 per ton, less 2½%, price reduced; Heavy Commercial, reduced to £23 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
Menthol.—A.B.R. recrystallised B.P., 46s. net per lb., October delivery. Synthetic, 22s. 6d. to 27s. 6d. per lb., according to quality. English make. Very heavy demand.
Mercurials.—Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb.; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 4s. to 4s. 2d. per lb. Market firmer.
Methyl Salicylate.—1s. 8d. per lb. Demand increasing, price firmer.
Methyl Sulphonol.—16s. 9d. per lb.
Metol.—9s. per lb. British make.
Paraformaldehyde.—1s. 11d. for B.P. quality.
Paraldehyde.—1s. 2d. to 1s. 6d. per lb., according to quantity.
Phenacetin.—4s. to 4s. 3d. per lb.
Phenazone.—6s. to 6s. 3d. per lb. Spot lower than forward price.
Phenolphthalein.—4s. to 4s. 3d. per lb. Supply exceeds demand.
Potassium Bitartrate 99/100% (Cream of Tartar).—80s. per cwt., less 2½% for ton lots. Market very firm.
Potassium Citrate.—1s. 9d. to 1s. 11d. per lb.
Potassium Ferricyanide.—1s. 9d. per lb. in cwt. lots. Quiet.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Steady market.

Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included, f.o.r. London.
Potassium Permanganate.—B.P. crystals, 7½d. per lb., spot. Slightly easier.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—3s. 9d. per lb. In fair quantities.
Saccharin.—51s. 5d. to 53s. 8d. per lb., according to quantity. Fair demand.
Salol.—3s. per lb.
Silver Proteinate.—12s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—1s. 10d. to 2s. 2d. per lb.
Sodium Citrate, B.P.C., 1911.—1s. 6d. to 1s. 9d. per lb., B.P.C., 1923. 1s. 9d. to 2s. per lb., according to quantity. Advanced.
Sodium Hyposulphite, Photographic.—£14 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—75s. to 80s. per cwt., according to quantity.
Sodium Salicylate.—Powder, 1s. 11d. to 2s. per lb. Crystal, 2s. to 2s. 2d. per lb. Flake, 2s. 3d. to 2s. 4d. per lb. Very heavy demand.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.
Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
Sulphonol.—12s. per lb. Limited demand.
Thymol.—13s. to 15s. per lb.

Perfumery Chemicals

Acetophenone.—9s. per lb.
Aubepine (ex Anethol).—11s. per lb.
Amyl Acetate.—3s. per lb.
Amyl Butyrate.—6s. 6d. per lb.
Amyl Salicylate.—3s. 1½d. per lb.
Anethol (M.P. 21/22° C.).—6s. 6d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 4d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 4d. per lb.
Benzaldehyde free from Chlorine.—2s. 9d. per lb.
Benzyl Benzoate.—2s. 9d. per lb.
Cinnamic Aldehyde Natural.—16s. 9d. per lb.
Coumarin.—12s. 6d. per lb.
Citronellol.—16s. per lb.
Citral.—9s. 6d. per lb.
Ethyl Cinnamate.—9s. per lb.
Ethyl Phthalate.—3s. per lb.
Eugenol.—10s. per lb.
Geraniol (Palmarosa).—23s. 6d. per lb.
Geraniol.—8s. to 16s. per lb.
Heliotropine.—6s. 3d. per lb.
Iso Eugenol.—14s. 6d. per lb.
Linalol ex Bois de Rose.—18s. per lb.
Linalyl Acetate.—18s. per lb.
Methyl Anthranilate.—9s. 3d. per lb.
Methyl Benzoate.—5s. per lb.
Musk Ketone.—40s. 6d. per lb.
Musk Xylol.—5s. 9d. per lb.
Nerolin.—4s. per lb.
Phenyl Ethyl Acetate.—14s. per lb.
Phenyl Ethyl Alcohol.—11s. 6d. per lb.
Rhodinol.—36s. 6d. per lb.
Safrol.—1s. 4d. per lb.
Terpineol.—1s. 8d. per lb.
Vanillin.—21s. 6d. to 23s. 6d. per lb. Good demand.

Essential Oils

Almond Oil.—12s. 6d. per lb.
Anise Oil.—3s. 9d. per lb.
Bergamot Oil.—24s. per lb.
Bourbon Geranium Oil.—14s. 3d. per lb.
Camphor Oil.—60s. per cwt.
Cananga Oil, Java.—11s. 3d. per lb.
Cinnamon Oil, Leaf.—5d. per oz.
Cassia Oil, 80/85%.—11s. per lb.
Citronella Oil.—Java, 85/90%, 3s. 5d.; Ceylon, 2s. 4d. per lb.
Clove Oil.—7s. 3d. per lb.
Eucalyptus Oil, 70/75%.—1s. 10d. per lb.
Lavender Oil.—French 38/40% Esters, 28s. per lb.
Lemon Oil.—7s. per lb.
Lemongrass Oil.—4s. 9d. per lb.
Orange Oil, Sweet.—10s. 9d. per lb.
Otto of Rose Oil.—Bulgarian, 60s. per oz. Anatolian, 35s. per oz.
Palma Rosa Oil.—13s. 6d. per lb.
Peppermint Oil.—Wayne County, 88s.; Japanese, 28s. 9d. per lb. Market excited.
Petitgrain Oil.—9d. per lb.
Sandal Wood Oil.—Mysore, 26s. lb. Australian, 18s. 6d. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, November 13, 1925.

BUSINESS in the heavy chemical market still remains fairly active although quantities called for are not large.

Prices show little or no change from our last report with the exception of caustic potash which has been reduced about 30s. per ton.

Industrial Chemicals

ACID ACETIC.—In usual steady demand, 98/100% quoted £55 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £40 to £42 per ton; 80% technical, £38 to £40 per ton, packed in casks, c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated, or small flaked, £40 per ton. Powdered, £42 per ton, packed in bags carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Unchanged at about 4½d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Prices rather easier at about 1s. 3½d. per lb., less 5%, ex wharf.

ACID FORMIC 85%.—Quoted £46 per ton, ex wharf. Prompt shipment from the continent.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC 80%.—Remains unchanged £23 5s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—With the report of a convention having been formed for the sale of this article on the continent, prices have an upward tendency. Spot material still available about 3½d. per lb., ex store. Offered from the continent at about 3½d. per lb., ex wharf, duty paid.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Steady demand and price unchanged at about 11½d. per lb., less 5% ex wharf.

ALUMINA SULPHATE 17/18%, IRON FREE.—Quoted £6 15s. per ton, ex store, spot delivery. Offered for prompt shipment from the continent at £6 5s. per ton, c.i.f. U.K. ports.

ALUM. LUMP POTASH.—On offer from the continent at £8 per ton c.i.f. U.K. ports. Spot material available at £9 5s. per ton, ex store. Powdered quality quoted £7 15s. per ton, c.i.f. U.K. ports.

AMMONIA ANHYDROUS.—In moderate demand and price unchanged at 1s. 4½d. per lb., less 5%, ex station. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton. Powdered, £39 per ton. Packed in 5 cwt. casks, delivered U.K. ports.

AMMONIA LIQUID 880°. In usual steady demand and price unchanged at 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals now quoted £27 10s. per ton, ex station. Offered from the continent at about £23 5s. per ton, c.i.f. U.K. ports. Fine white crystals quoted £19 5s. per ton, c.i.f. U.K. ports.

ARSENIC, REFINED WHITE CORNISH.—Now on offer at about £18 10s. per ton, ex wharf, early delivery. Spot material quoted £21 per ton, ex store.

BARIUM CHLORIDE.—Large white crystals quoted £9 per ton, ex store. Spot delivery on offer from the continent at about £7 15s. per ton, c.i.f. U.K. ports. Fine white crystals quoted £7 5s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—English material quoted £9 10s. per ton, ex station, contracts 20s. per ton less. Offered from the continent at £8 2s. 6d. per ton, c.i.f. U.K. ports.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton; carriage paid U.K. stations.

CALCIUM.—English manufacturer's price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, carriage paid U.K. stations. Continental unchanged at about £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—In good demand for export. Price unchanged at about £3 7s. 6d. per ton, f.o.b. U.K. ports, packed in casks.

COPPER SULPHATE.—English material for export now quoted £23 10s., f.o.b. U.K. ports. Continental on offer at about £23 per ton, ex wharf.

FORMALDEHYDE 40%.—Spot material on offer at £41 10s. per ton, ex store. Offered for prompt shipment from the continent at about £41 per ton, c.i.f. U.K. ports.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 17s. 6d. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material on offer at £44 per ton, ex store.

LEAD, WHITE.—Quoted £44 10s. per ton, ex store, spot delivery. On offer from the continent at about £43 per ton, ex wharf.

LEAD ACETATE.—White crystals offered from the continent at £44 per ton, c.i.f. U.K. ports. Quoted £45 per ton, ex store, spot delivery.

MAGNESITE, GROUND CALCINED.—In moderate demand and price unchanged at about £8 15s. per ton, ex station.

POTASH CAUSTIC, 88/92%.—Syndicate prices reduced to £26 per ton, c.i.f. U.K. ports. Spot material available at about £28 per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE, 96/98%.—Rather higher quotations from the continent. Now quoted £26 per ton, c.i.f. U.K. ports. Spot material available at about £26 15s. per ton, ex store.

POTASSIUM CHLORATE, 98/100%.—Offered from the continent at £30 per ton, c.i.f. U.K. port for powdered, £32 10s. crystals; only small quantities available for near delivery.

POTASSIUM NITRATE, SALTPETRE 99%.—Refined granulated quoted £24 15s. per ton, c.i.f. U.K. ports. Spot material available at about £27 5s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Spot material quoted 8d. per lb., ex store. Offered for early delivery at 7½d. per lb., ex wharf.

POTASSIUM PRUSSIAN YELLOW.—In good demand and price remains unchanged at about 7½d. per lb., ex store.

SODA CAUSTIC.—76/77%, £17 10s. per ton; 70/72%, £16 2s. 6d. per ton; broken 60%, £16 12s. 6d. per ton; powdered 98/99%, £20 17s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Spot material now quoted £18 10s. per ton, ex store. Offered from the continent at about £17 15s. per ton, c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—English price unchanged at 3½d. per lb., delivered.

SODIUM CARBONATE, SODA CRYSTALS.—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, £1 7s. 6d. per ton more; alkali, 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture unchanged at £9 10s. per ton, ex station, minimum ton lots. Pea crystals, £14 per ton, ex station. Continental commercial quality quoted £9 5s. per ton, ex store.

SODIUM NITRATE.—Quoted £13 per ton, ex store; 96/98% refined quality 7s. 6d. per ton extra.

SODIUM NITRITE, 100%.—Quoted £24 per ton, ex store. Offered from the continent about £22 5s. per ton, c.i.f. U.K. ports.

SODIUM PRUSSIAN, YELLOW.—Still in good demand and price for spot material now about 4½d. per lb., ex store. On offer from the continent at 4½d. per lb., ex wharf.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption, £3 10s. per ton, f.o.r. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English material. Solid, 60/62%, now £13 per ton; broken, £14 per ton; flake, £15 per ton; crystals, £8 10s. per ton; carriage paid U.K. stations, minimum 4-ton lots with slight reductions for contracts to the end of the year. 60/62% solid offered from the continent at £10 15s. per ton, c.i.f. U.K. ports; broken £1 per ton more; 30/32% crystals, £7 15s. per ton, c.i.f. U.K. ports.

SULPHUR.—Flowers, £10 10s.; roll, £9 10s.; rock, £9 7s. 6d.; ground, £9 5s., per ton, ex store, spot delivery. Prices nominal.

ZINC CHLORIDE, 98/100%.—Quoted £23 per ton, c.i.f. U.K. ports, prompt shipment from the continent. English material, 96/98% quoted £23 15s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Of continental manufacture on offer at about £11 15s. per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHOL.—2s. to 2s. 1d. per lb. Some fair home inquiries.

METANITRANILINE.—3s. 6d. to 3s. 8d. per lb. Fair home inquiries.

ALPHA NAPHTHYLAMINE.—1s. 2d. to 1s. 3d. per lb. Some home inquiries.

ORTHONITRANILINE.—5s. 9d. per lb. Some home inquiries.

PARANITRANILINE.—1s. 8d. to 1s. 9d. per lb. Some home inquiries.

The Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, November 13, 1925.

ON the chemical market here this week a weaker tendency has been apparent in one or two lines but, for the most part, heavy chemicals have fully maintained their recent levels and in some few instances there has been added firmness. The home demand has been fairly good on the improvement in some of the consuming industries. The cotton textile industry, however, on which chemical traders are largely basing their hopes for the future, is in a rather confused state and up to now has not registered the improvement which has been looked for as a result of the bumper American crop.

Heavy Chemicals

Prussiate of soda is in quiet demand with prices well held at the recent level of 4d. per lb. Soda crystals are maintained at about £5 5s. per ton and a fair amount of business is being put through. Saltcake is about £3 12s. 6d. per ton and inquiry for shipment is reported. Sodium sulphide is not particularly active but values are about unchanged from last report; 60-65 per cent. concentrated solid is on offer at £11 15s. per ton and commercial material at £9 10s. Glauber salts are in limited request at about £3 10s. per ton. Hyposulphite of soda is easy at £14 5s. per ton for photographic crystals and about £9 for commercial, and sales are slow. Acetate of soda is still quoted at round £17 10s. per ton, but the demand for this material is rather quiet. Chlorate of soda meets with a moderate inquiry and values are steady at about 2½d. per lb. Alkali is firm at £6 15s. per ton and business is fairly good. Caustic soda continues to meet with a steady demand at from £15 12s. 6d. per ton for 60 per cent. material to £18 for 76-77 per cent. Bleaching powder is quiet and easy at £9 per ton. Bicarbonate of soda is still quoted on the basis of £10 10s. per ton but sales are only moderate. Bichromate of soda is in limited request and prices are easy at 3½d. to 3¾d. per lb. Phosphate of soda is still on the quiet side, although values remain round £12 5s. per ton.

Among potash compounds carbonate is steady and in fair request at £25 to £25 10s. per ton. Business in caustic potash is not very brisk and prices are easy at about £27 per ton for 90 per cent. material. Chlorate of potash is well held at about 4d. per lb. Permanganate of potash is in quiet demand and prices are maintained; B.P. quality is on offer at 7½d. per lb. and commercial at round 6d. Bichromate of potash is quiet and cheaper at 4½d. per lb. Yellow prussiate of potash is firm and in fairly active inquiry at about 7½d. per lb.

Arsenic continues in the doldrums and with demand strictly limited values are weak; white powdered, Cornish makes, is now quoted at £16 per ton on rails. A fair amount of interest is being taken in sulphate of copper and prices are steady at £24 to £24 10s. per ton. Nitrate of lead keeps steady at £41 to £41 10s. per ton, although demand is restricted. Acetate of lead is firm at £44 to £45 per ton for white and £39 to £40 for brown. Grey acetate of lime meets with a moderate amount of inquiry at £14 10s. to £15 per ton, with brown rather quiet at £7 10s. to £8. Epsom salts are in fair request at £3 15s. to £4 per ton, with magnesium sulphate, pharmaceutical quality, quoted at £5.

Acid and Tar Products

Citric acid is rather inactive and prices are easy at round 1s. 3½d. per lb. Oxalic acid is about unchanged from last week at 3½d. per lb., but business shows little or no improvement. Tartaric acid is quoted at 11½d. per lb., with demand quiet. Acetic acid is steady and in fair request at round £38 per ton for 80 per cent. commercial and £66 to £67 for glacial.

Crude naphthalene is fairly active at from £4 5s. per ton with refined about unchanged at £12 to £13. Pitch is in limited demand at about 40s. per ton. Solvent naphtha is steady at 1s. 5½d. per gallon but business is far from brisk. Creosote oil meets with a fair amount of inquiry at about 6d. per gallon. Carbolic acid is still very dull at 4½d. per lb. for crystal at 1s. 3d. to 1s. 4d. per gallon for crude material.

The German Dye Trust Objects and Organisation

THE formalities in connection with the formation of the large German dye trust (the Frankfort correspondent of *The Times* states) are practically disposed of and the work of internal organisation is in progress. Herr Duisberg, the president of the Elberfelder Farbenfabriken, formerly Bayer and Co., which concern is represented in the new trust with a capital of £8,860,000, gave a short survey on November 5 of the objects and development of the fusion in the German dye industry. The total capital of the trust will amount to £32,080,000.

Herr Duisberg explained that in consequence of the loss of 50 per cent. of the former turnover of the group of firms represented by the Interessen Gemeinschaft (I.G.), the urgent necessity arose to secure an increased measure of concentration and mobility. The large stocks carried by the Elberfelder Farbenfabriken would have enabled them partially or entirely to close their works in the interests of economy for a considerable period, but this was found extremely difficult within the limits of the present constitution of the I.G. There was always the risk—in case of the lapse of the I.G. agreement, which might occur at any time on account of the new Trust Laws threatened by the Government—that those firms which adopted a policy of closing down would jeopardise a large part of their markets. Such risk would be lessened under the protection of the trust, and it was largely due to this consideration that the fusion was initiated.

Some light was thrown by Herr Duisberg on the future organisation of the new combine. The production of the various works is to be concentrated into four groups, situated respectively in the Upper Rhine, the Central Rhine, the Lower Rhine, and in Central Germany. The sales organisation dealing with nitrogen, dyes, pharmaceutical articles, and photographic products will be centralised in Frankfurt. The scheme is described as one of "regionally decentralised centralisation." The respective boards of directors will be combined and converted into a council of administration whose duty will be to carry out the obligations devolving upon a board in regard to the individual concerns. Herr Bosch will become president of the trust and Herr Duisberg chairman of the administrative council.

The present trade situation, it was stated, created certain difficulties, but these were not so serious as in many other branches of industry. As the large stocks which were produced during the inflation period have been disposed of to a large extent, no great loss was anticipated under this heading. There was every reason to believe that the inventive talent of the chemists in the laboratories of the various works would continue to produce good results. Only quite recently, in the province of dyes, a large number of new products had not only been discovered and patented, but had been successfully produced on a large scale and already marketed.

Binders for Briquetting

It is announced that a meeting of the South Wales Institute of Engineers, of which Mr. H. Spence Thomas is president, will be held at the Royal Metal Exchange, Swansea, on November 19, at 3 p.m., when an address will be given on "Binders for Briquetting, with special reference to Pulp Binders," discussing the nature, applications, and description of binders for manufacture of smokeless fuel, by Captain C. J. Goodwin, M.I.Chem.E., and Dr. G. N. White, F.I.C. In connection with this meeting, the Council has arranged a visit to the Cambrian Patent Fuel Works, Prince of Wales' Dock, Swansea, at 11 a.m. on the same day, in response to the invitation of S. Bornett and Co., London, Managing Agents for Pulp Binders, Ltd.

The plant has a maximum capacity of 40 tons per hour of 1½ oz. anthracite ovoids, with storage and loading facilities direct into steamers or trucks. Items of interest include large masticator mills for intimate mixing, a novel type of conveyor and dryer, and the electrical equipment. The plant is being converted at low cost for the use of a patented vegetable binder of almost universal availability, giving weatherproof ovoids, the combustion of which in open and closed stoves will be demonstrated. About 4 per cent. of binder is used, and it is proposed to make 5 or 10 tons of ovoids during the visit, working continuously, and illustrating the method of transition from experimental to continuous working. Raw materials will be exhibited and details given of further developments.

Company News

FULLERS' EARTH UNION, LTD.—A dividend of 5 per cent., actual, less tax, has been declared on the ordinary shares for the past half-year, payable on November 15.

NOBEL INDUSTRIES, LTD.—An interim dividend on the ordinary shares for the year ending December 31, 1925, at the rate of 3 per cent. actual, less tax, is payable on January 1.

BRUNNER, MOND AND CO., LTD.—The directors have declared an interim dividend on the ordinary shares for the half-year ended September at the rate of 7 per cent. per annum, payable, less tax, on December 17.

BRITISH DYESTUFFS CORPORATION, LTD.—It is announced that meetings of shareholders will be held towards the end of the month to consider an agreement with the Government and a scheme for capital reconstruction.

SANTA CATALINA NITRATE CO., LTD.—The directors have decided to recommend to the shareholders at the annual general meeting, to be held on November 25, a final dividend of 15 per cent., less income tax, making a total of 20 per cent. for the year ended June 30 last.

BROKEN HILL PROPRIETARY (BLOCK 14) CO.—Operations for the half-year ended September 30 resulted in a total working profit of £25,351, against £13,577 for the corresponding half of last year. The net profit amounted to £18,552, comparing with £10,247.

LAGUNAS SYNDICATE.—A gross profit, for the year to the end of June last, of £40,243 is reported. London expenses, etc., now absorb £36,961, and, with £4,091 brought in and £1,987 from the reserve, there is an available balance of £9,360, out of which the directors are paying a dividend of 2 per cent., leaving £767 to be carried forward.

PAN DE AZUCAR NITRATE CO., LTD.—The trading profit for the year to June 30 last was £60,152, the net profit being £36,182. The balance brought forward was £8,759, making an available total of £44,941. A sum of £15,000 has been transferred to reserve account, and a final dividend of 20 per cent., less tax, is proposed, making 25 per cent. for the year, leaving to be carried forward £8,457.

BRADFORD DYERS' ASSOCIATION, LTD.—At an extraordinary general meeting of the shareholders at Bradford on November 5, the Articles of Association were altered so as to make the dividend position of the employee shareholders on the bonus register exactly the same as it was before the decision to capitalise £813,886 of the reserve fund and to create half a million preference and half a million ordinary shares of £1 each.

WEARDALE LEAD CO.—The accounts for the twelve months ended September 30 last show a profit of £23,687. After writing down plant, property and machinery account by £3,724, and placing £4,500 to reserve, the total amount to be dealt with, including the balance brought forward, is £22,614. The directors recommend a final dividend of 2s. 6d. per share, making with the interim dividend already paid 17½ per cent. for the year, leaving £5,478 to be carried forward.

LIVERPOOL NITRATE CO., LTD.—The report of the directors for the year ended June 30 last states that the balance of profit and loss from the previous account was £57,391, less the final dividend paid November 29, 1924, 3s. per share, less tax, leaving £16,704. To this has to be added a profit for the year ended June 30 last of £51,255, making a total of £67,959. Deducting the interim dividend paid May 26, 1925, of 1s. 6d. per share, less tax, there remains £47,615. The directors recommend the payment on November 28 of a final dividend of 1s. 6d. per share, less tax, making, with the interim dividend, a total of 3s., less tax, for the year.

Carbon Dioxide Recorders

To prevent wastage of fuel and to ensure correct combustion it is necessary to utilise reliable instruments to measure the CO₂ and CO content of flue gases and also the temperature of these gases. In Fuel Economy Booklet No. W.157, the Cambridge Instrument Co., Ltd., 45, Grosvenor Place, S.W.1, describes apparatus which give all these measurements on one indicator or on one recorder. Readers interested will be supplied with a copy of the booklet by mentioning THE CHEMICAL AGE.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to December 4, 1925.

"GENOXIDE."

458,149. For hydrogen peroxide for use in manufactures. B. Laporte, Ltd., Kingsway, Luton, Bedfordshire, chemical manufacturers. April 17, 1925. (To be Associated. Sect. 24.)

"HYDROSITE."

461,592. For hydrosulphite of soda for use in manufactures. Stockport United Chemical Co., Ltd., Buxton Road Works, Stockport, manufacturers of dyes and chemicals for the textile trades. August 21, 1925.

Opposition to the Registration of the following Trade Marks can be lodged up to December 11, 1925.

"DURANOL."

449,362. For dyestuffs. Class 1. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester; manufacturers of dyestuffs and chemicals. June 18, 1924. (To be associated. Sect. 24.)

"SUPRAMIN."

453,912. For colours and dyes. Class 1. Farbenfabriken vorm. Friedr. Bayer and Co. (a joint stock company organised under the laws of Germany), Leverkusen, near Cologne on the Rhine, Germany; manufacturers. November 24, 1924.

"RODINE."

456,376. For chemical substances in solid or liquid form for use in metal pickling. Class 1. American Chemical Paint Co. (a corporation organised under the laws of the State of Delaware, United States of America), corner of Brookside Avenue and Reading Railroad, Ambler, Montgomery County, Pennsylvania, United States of America; manufacturers. February 17, 1925.

"MATTOLEO."

463,174. For partly prepared vegetable, animal and mineral substances used in manufacture of paint and in other manufactures, not included in other classes. Class 4. Norman Lee, 133, Moorgate, London, E.C.2; manufacturing chemist. October 13, 1925.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CREOSOTE.—The Administration of the South African Railways and Harbours invites tenders by December 3 for supply of 50,000 gallons of creosote. (Reference No. B.X. 2121.)

LINSEED OIL.—The Prague-South Railway Administration is calling for tenders for the supply of 20,000 kgs. of linseed oil. Local representation is essential. Particulars from Department of Overseas Trade. (Reference B.2160.)

METALS.—A commission agent in Santiago wishes to represent a British manufacturer of various classes of non-ferrous metals, in sheets, bars, and tubes; also of all kinds of white metals. (Reference No. 542.)

PAINTS, OILS, AND DYES.—An Auckland firm of agents wish to represent British manufacturers of the above lines on a commission basis for the whole of New Zealand. (Reference No. 554.)

CHEMICAL PRODUCTS, ETC.—A firm in Milan wishes to represent on a commission basis for the whole of Italy British producers and direct exporters of oilseeds, chemical products, etc., for tanners and dyers. Corresponds in English. (Reference No. 564.)

DYES, ETC.—An import merchant in Damascus desires to represent British firms for dyes, ochre, and gum. (Reference No. 574.)

Royal Society Medals

THE following are among the awards just made by the President and Council of the Royal Society :—

Royal Medals.—Professor W. H. Perkin, F.R.S., for work on the constitution of the alkaloids; and Professor A. C. Seward, F.R.S., for researches on the palæobotany of Gondwanaland.

The Copley Medal to Professor A. Einstein, Foreign Member R.S., for his theory of relativity and his contributions to the quantum theory.

The Davy Medal to Sir James Irvine, F.R.S., for his work on the constitution of the sugars.

The Sylvester Medal to Professor A. N. Whitehead, F.R.S., for his researches on the foundations of mathematics.

The Hughes Medal to Mr. F. E. Smith, F.R.S., for his determination of fundamental electrical units and for researches in technical electricity.

The following have been recommended by the President and Council for election to the Council at the anniversary meeting on November 30 :—President, Sir Ernest Rutherford; Treasurer, Sir David Prain; Secretaries, Mr. J. H. Jeans and Dr. H. H. Dale; Foreign Secretary, Sir Richard Glazebrook. Other Members of Council.—Professor J. H. Ashworth, Professor L. Bairstow, Professor F. O. Bower, Professor S. Chapman, Sir Dugald Clerk, Professor F. G. Donnan, Professor E. J. Garwood, Professor J. P. Hill, Professor J. B. Leathes, Professor J. C. G. Ledingham, Sir Thomas Lewis, Professor F. A. Lindemann, Sir Robert Robertson, Sir Charles Sherrington, Dr. G. C. Simpson, and Mr. W. C. D. Whetham.

Aluminium Welding Claim

THE Commission on Awards to Inventors, sitting at the Law Courts, London, on Monday, were asked to assess compensation for the use of a certain flux for the welding of aluminium owned by the Aktiengesellschaft für autogene aluminium, Schweissung, who claimed £3,388.

Mr. Colefax, for the applicants, said the claim arose out of two patents dated 1906. Until the use of the flux covered by the patents aluminium welding was not practised, but since its use such welding had been enormously practised, and he knew of no other method in use to-day. The applicants originally claimed £3,388 4s. 10d. in respect of use of the flux by the London Aluminium Co., Ltd. Mr. Justice Sargant decided that applicants' patents were valid and had been infringed, and on appeal this decision was upheld by the House of Lords. The claimants' rights as against the London Aluminium Co. had been allowed to go, and the Crown now stood in the place of the defendant.

Mr. Whitehead, for the Crown, contended that the licences referred to by the claimants were mere paper licences, that the flux was sold by the claimants in this country at 14s. 6d. per lb., and that the purchase carried with it the right to use it.

The decision of the Commission will be announced in due course.

Tariff Changes

NORWAY.—An export tax on cod liver oil comes into force on January 1, 1926.

UNITED STATES OF AMERICA.—Calcium ferro-cyanide and all other ferrocyanides, cyanates, and sulphocyanides or thiocyanates are now assessed as chemical salts, etc., at a rate of 25 per cent. *ad valorem*.

FRANCE.—A Decree provides for the temporary duty free importation of certain metals—types of iron, steel, copper, provided they are to be worked up and re-exported. Full text is on view at the D.O.T.

BELGIUM.—Certificates of origin, to obtain "minimum" tariff treatment, are still required in respect of hydrogen and oxygen, liquefied or compressed; sulphurous acid and carbonic acid, liquefied or compressed; acetylene, compressed; ammonia liquefied by pressure; chrome alum; chrome green; mountain, Brunswick, Bremen, Frisian, and Schweinfurt greens, and mineral pigments with copper base, not specified in the tariff; and carbonate of lead in the Chemicals, etc., Section of the tariff.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

LAING, Robert (trading as Marshall and Co.), 44, Disraeli Road, Forest Gate, manufacturing chemists. (C.C. 14/11/25.) £32 os. 8d. October 5.

SMITH, Walter, 28, Colchester Terrace, Sunderland, wholesale druggist. (C.C., 14/11/25.) £23 is. od. October 7.

Mortgages and Charges

[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]

BAIRD AND TATLOCK (LONDON), LTD., laboratory furnishes. (M., 14/11/25.) Registered November 2, £2,100 debentures, part of £20,000; general charge. *£3,300. August 7, 1925.

GREENWOOD DYEING CO., LTD., Bradford. (M., 14/11/25.) Registered October 8, trust deed dated September 21, 1925 (supplemental to trust deed dated February 5, 1924, securing £600,000 first debenture stock created by Globe Worsted Co., Ltd.); charged on company's freehold properties at Bradford, also general charge. *Nil. May 26, 1925.

TIPPER (B. C.) AND SON, LTD., Birmingham, manufacturers of animal medicines. (M., 14/11/25.) Registered October 27, £8,000 debentures; general charge.

Satisfactions

MINTON (R. R.) AND CO., LTD., Liverpool, paint manufacturers, etc. (M.S., 14/11/25.) Satisfaction registered October 30, £5,000 registered July 28, 1911.

MORRIS (P.) AND CO., LTD., Birkenhead, paint manufacturers. (M.S., 14/11/25.) Satisfactions registered October 30, £3,000 registered June 29, 1911; and £2,000 registered February 2, 1921.

London Gazette, &c.

Company Winding Up

BRITISH POTASH CO., LTD. First dividend, 1s. 3d. per £, payable at the office of the Official Receiver and Liquidator, 33, Carey Street, Lincoln's Inn, London, W.C.2.

Receivership

THAMES BANK CHEMICAL WORKS, LTD. (R., 14/11/25.) C. H. Whatley, of 6-7, Charing Cross Chambers, Duke Street, Adelphi, W.C.2, was appointed receiver on October 29, under powers contained in debenture dated June 2, 1925.

New Companies Registered

ANGLO-OVERSEAS CHEMICAL CORPORATION, LTD., 17, Victoria Street, London, S.W.1. To carry on business indicated by the title. Nominal capital, £5,000 in £1 shares.

SILVERTOWN TARMACADAM CO., LTD., Salisbury House, London Wall, E.C.2. Dealers in slag, stone, or other materials, and manufacturers and preparers of the same into tarred slag, tarmacadam, etc. Nominal capital, £10,000 in £1 shares. The secretary is to be appointed by Burt, Boulton and Haywood, Ltd.

